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USSR Report

TRANSPORTATION

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CIVIL AVIATION

MINISTRY PLANS FOR IMPROVING ATC SAFETY RECORD

Moscow VOZDUSHNYY TRANSPORT in Russian 14 Jun 86 p 2

[Report on Ministry of Civil Aviation Collegium meeting under the rubric "Following the Course of the 27th CPSU Congress": "To Achieve the Principal Objective: From the MGA Collegium"]

[Text] There is not and cannot be a more vital and important task for civil aviation employees than unconditional fulfillment of the plan with the assurance of comprehensive flight safety. Measures being undertaken in the sector, particularly those for improving air traffic control, are helping to achieve this objective. This question was the focus of attention at the meeting of the MGA [Ministry of Civil Aviation] Collegium on 12 June 1986.

After listening to and discussing the report by V. Shelkovnikov, chief of the TsUVD [Air Traffic Central Administration], the collegium noted that specific work had been carried out by the collective of the service to improve the organization of UVD [air traffic control] and radio and meteorological support for flights and to reinforce personnel and increase their vocational training.

Automated ATC systems were introduced at many of the sector's airports over the 1985-1986 period: "Trassa" at the Simferopol RTs YeS UVD [Regional Center of the Unified ATC System], "Start" at the Zvartnots Airport in Yerevan, and secondary radar facility complexes in the Borispol, Kharkov, Ufa, Leningrad and Lvov ATC regions, as well as a system for warning controllers of unsafely converging traffic at the Moscow, Kiev and Mineralnyye Vody AUVD [Automated ATC Centers].

A psychological and physical examination of controllers and a reexamination of all personnel in the service has been conducted.

An analysis of converging approaches by aircraft over the past 10 years, along with specific measures to prevent them, has been worked out and sent to administrations and aviation enterprises.

In order to ensure further improvement in the process of training traffic service specialists, instruction of those with higher education has been centered at the Academy of Civil Aviation and the Kirovograd Higher Flight School of Civil Aviation; those with secondary specialized education will be trained at the Riga Flight and Technical School of Civil Aviation.

ICAO [International Civil Aviation Organization] standards and recommendations continue to be incorporated in ATC practice.

However, despite the steps being taken, flight safety under air traffic control still does not meet today's requirements.

The lack of effective supervision by command and management personnel of civil aviation administrations and aviation enterprises (Georgian, Krasnoyarsk, Urals, Leningrad) of the activity of this important and vital service continues to be conducive to violations of flight safety under ATC, to a low level of labor and technical discipline, and to shortcomings in the vocational training of controller personnel in organizing the work of ATC shifts.

Requirements of the Ministry of Civil Aviation Collegium and the presidium of the Aviation Workers Trade Union Central Committee for improving the living conditions of traffic service specialists are not being implemented, which is one of the basic reasons for the low staffing strength and the high personnel turnover. The lowest staffing is in the Azerbaijan (V. G. Sadykhly), Armenian (D. A. Atbashyan), Georgian (A. I. Zedgenidze), Far East (V. A. Necharov), Magadan (A. A. Yershov), North Caucasus (V. S. Zamyatin), Tyumen ((G. P. Laskin), and Yakutsk (I. S. Dergilev) Administrations of Civil Aviation.

Requirements for supplying controller simulators, panels and mobile posts for directors of flight operations are not being fully met.

The quality of meteorological support is not meeting the increased requirements of civil aviation to the full extent. Procedures for forecasting squalls and wind shear have not been developed. Efficient instruments for measuring visibility are lacking at civil aviation airports.

The shortcomings in ensuring flight safety under air traffic control attest to the fact that the chiefs of administrations, the commanders of aviation enterprises and their deputies are not devoting the proper attention to implementation of the guidance documents for organizing and developing the ATC system.

In its decree, the Ministry of Civil Aviation Collegium made it incumbent upon managers of the TsUVD and administrations to eliminate the shortcomings noted. A program for sharply improving the quality of air traffic control was elaborated in it as well.

V. Solomatin, chief of the Economic Planning Main Administration of the Ministry of Civil Aviation, provided information on the ministry's progress toward the changeover of civil aviation administrations and enterprises to new conditions of management.

The collegium meeting also examined the status of zagrankadry [foreign personnel] and measures to improve work with them in light of current requirements.

CIVIL AVIATION

SPECIAL CONCERNS OF ATC SAFETY IN MOUNTAINOUS AREAS

Moscow GRAZHDANSKAYA AVIATSIYA in Russian No 3, Mar 86 p 26

[Article by A. Yevseyev, chief of the Traffic Department, Kazakh Administration of Civil Aviation: "Taking Mountainous Terrain into Account"]

[Text] High responsibility, conscientious discipline, and a sense of duty in alliance with exemplary vocational skill--these are the primary qualities in the air traffic control specialists' work. These demands made upon controller personnel increase more and more when flights are directed at mountain airports, since UVD [air traffic control] is considerably more complicated under these conditions. It is no coincidence that flights by aircraft in the mountains are classified with flights under special conditions.

Unfortunately, both controllers and crews frequently violate technical and performance discipline and do not observe the established requirements for flights in a mountainous area. These include a fundamental ATC principle for mountain airports: "I have you in sight--cleared for descent!" Let us say that the controller, by not seeing an aircraft on the radar screen, gave the crew a command to change altitude. So an error has "slipped into" control of the flight which is certain to entail a series of other errors. And as a result, the procedure for letdown and approach is disrupted.

In mountainous areas, all flight maneuvers connected with an aircraft's descent in the vicinity of an airport should be performed strictly in accordance with the procedure for that airport. It is no coincidence that the instruction which begins "Observance of procedure is the rule of a mountain airport!" is found at control tower work positions. But the main point is that each controller must be fully aware that a crew feels much more confident in a descent pattern, not outside its limits, in the mountains.

Nevertheless, in order to establish the necessary separation in controlling traffic flows, pattern controllers often assign a flight path by "tightening up" the base leg. In particular, "such a method" has been used by some controllers in the Alma-Ata region. In order to provide a barrier to these violations, the traffic control department (together with traffic service specialists) developed several flight paths for these purposes, including by extension of the traffic pattern at the base leg position.

They added all the elaborations and supplements to the flight regulations. However, not all controllers were able to reorient themselves psychologically: the "habits" of many years prevailed. As a result, even the experienced senior controller A. Silimenev flagrantly violated the regulation requirements--he directed a Tu-154 out of one corridor into another one erroneously, and the aircraft found itself outside the approach pattern. They discussed this irresponsible act carefully in the service and gave him an evaluation based on the highest principle. A. Silimenev was relieved of duty for violating ATC principles in a mountainous area.

In talking with a flight crew, you sense every time the concern about a common objective--ensuring flight safety. The crews place their trust in us, the ATC specialists, and we should reciprocate this trust with high professional training, accuracy in our work, and constant readiness to provide them with prompt assistance. But there is "another side to the coin": a competent controller and a competent aircraft commander suddenly prove to be irresponsible persons. They rightly say of such persons: "A competent specialist is not the one who comes out of a difficult situation creditably, but one who will not permit it, and prevents it beforehand." This is why these principles are so important in a mountainous area: "Think--and actively assist," "Monitoring facilities are available--make use of them under ATC!" and "If an aircraft leaves a restricted heading, it should be at an altitude no lower than a dangerous one!" Adherence to these principles makes it possible to promptly avoid any errors and to ensure the safe completion of every flight.

Incorrect actions by controller personnel associated with their poor vocational preparation are still being encountered among the causes which provide the basis for accidents in flight. Unfortunately, in both the Academy of Civil Aviation and the flight and technical schools where air traffic controllers are trained, very little attention is being devoted to the problems of the vocational preparation of young ATC specialists for work at mountain airports. These obvious deficiencies and omissions have to be rectified locally, during the training period and vocational studies in the traffic services.

Directors of flight operations have a major role in this important work. It depends on them whether the controller knows the important command altitudes in his area, the highest obstructions, the flight restrictions at safe altitudes, and the nature of terrain on air routes. With this objective, the controllers authorized to control air traffic at mountain airports are given a special overflight of traffic patterns, together with directors of flight operations, to familiarize themselves with the terrain of the locality and the man-made obstructions in the approach. This significantly improves the operational reliability of controllers under mountain conditions.

In our view, the organization of air traffic control itself needs further improvement at mountain airports. The patterns flown by aircraft in the vicinity of an airport should be aligned and precise and conform strictly to established rules.

And more. All the possible flight patterns should be incorporated in the flight regulations for mountain airports. They include the "tightening up" of the base leg, the go-around, straightening of routes, circumnavigation of neighboring airports, changes in landing heading, and so forth. At the same time, the documents for controllers should reflect all the aspects of flight operations at a specific airport. Operations procedures also should be specific and strictly applicable to a given mountainous area. A distinct algorithm of the controllers' actions must be set forth in it: for approaches to and departures from the airport from various directions, for different landing headings, and for different classes of aircraft as well. All sections of the operations procedures should have a well-defined, logical interpretation (understandable both to experienced specialists and controller trainees). Only then will the ATC methods and procedures be identical in all shifts of the traffic service. In working out operations procedures for controllers it is necessary first of all to adhere to the principle: "Operations procedure is the best checklist of mandatory operational elements only at a specific airport!"

There also are other problems of ATC organization at mountain airports that are no less important. In particular, optimizing airspace structure, establishing a system to monitor flights with the aid of secondary radars, improving the working conditions of ATC personnel by taking into account the latest research in ergonomics, organizing work at the panel by two controllers simultaneously, and other factors. But in improving ATC principles and operations procedure for controllers, it always must be remembered that while errors permitted by controllers under ordinary conditions do not always complicate a flight, any violation can lead to severe consequences under conditions in a mountainous area.

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CIVIL AVIATION

TESTING, ADVANTAGES OF An-3 AGRICULTURAL BIPLANE

Moscow SELSKAYA ZHIZN in Russian 27 Mar 86 p 4

[Article by B. Sadekov, SELSKAYA ZHIZN special correspondent: "The An-3 is Over the Field"; first paragraph is SELSKAYA ZHIZN introduction]

[Text] State tests have begun on the new An-3 airplane, a specially adapted model for use in agriculture.

Only one of them exists at present. It is white, with a blue stripe lengthwise and red bands on the wings and propeller blades. It came to a stop on the runway, like a watchful bird just about ready to take off.

The newcomer, as assumed, resembles its parent--the legendary An-2--very strongly: the same fuselage, the same wings, the same tail assembly and landing gear. But it is more advanced. It has acquired a new appearance with a new heart. The piston-driven engine has been replaced by a turboprop...

The An-2, or as it is affectionately called, the "Annushka," has been serving us faithfully for 40 years now. According to a statement by American experts, this is the most highly productive and best airplane in the world thus far for agricultural aviation. To begin with, it has superior flight characteristics, takes off and lands in a short distance, is simple to fly and operate, and is undemanding for airfields. But technology has made great progress over these years. The "Annushka" had to be replaced. Attempts in this direction were made more than once. In the period when the virgin land was being opened up, aircraft designers developed the An-2M. But only the agricultural equipment was improved in this airplane; the flight characteristics, and mainly the engine, were unchanged. At the beginning of the 1970's, they made an aircraft with a jet engine, the result of which was the M-15. However, it turned out that this aircraft did not meet the demands of the day, either.

Agriculture has been receiving more and more different chemical preparations and fertilizers in recent years. The toxicity of chemicals also increased with their expanded variety. The problem of protecting the pilot from harmful fumes became acute. An air conditioning system in the cockpit was necessary. Another problem emerged as well. By being provided with more and more advanced agricultural equipment, the An-2 became heavier. And this threatened the pilot's safety. An aircraft operating at low altitudes (no more than 5

meters above the ground involved in chemical weeding should be more maneuverable and be capable of bouncing up sharply, like a fighter. Noticing some obstruction (a single tree, telegraph pole, or farm structure) and knowing that the An-2 covers about 45 meters in a second, the pilot must promptly "jump over" this obstacle. This is where the agricultural aircraft needs "speed"; power is required for this, and the An-2 has been left with less and less of it.

So everything rested with the engine. At that time there were quite a few good turboprops, but there weren't any that were suitable. And when it finally was developed, the collective of the design bureau, headed at the time by O. K. Antonov, began developing the An-3 by the most reliable method from the viewpoint of economy--by modernizing the An-2.

"The An-3 was developed on the basis of a superb airframe perfected over decades," says the leading designer of the new aircraft, V. Ye. Zadorozhnyy. "The aircraft's high degree of continuity with the series An-2 makes it possible to modernize the aircraft made previously at minimum expense."

The An-3 has many advantages. The replacement of the piston-driven engine by a gas turbine engine has made the aircraft appreciably lighter, as a result of which its load capacity has been increased by 1.5 times as much: instead of 1,200 kilograms of chemical preparations, it now carries 1,800 kilograms. The turboprop engine operates on kerosene instead of gasoline, and it costs less. The new engine has made it possible to make use of compressed air in the cockpit air conditioning system. The aircraft is flown by one pilot, rather than two as previously. The productivity of the An-3 has been increased by 60 percent, and this is of no small importance if it is taken into account that Aeroflot treats more than 100 million hectares annually.

"Work on the An-3 was no less vital and important than on the famous 'Ruslan,'" says Ya. D. Goloborodko, the deputy general designer, "and no less complicated in its own way. The requirements for a relatively small aircraft are to a large extent the same ones as for a huge aircraft."

Test Pilot First Class Sergey Gorbik flew it for the first time.

"The first thing I became aware of was the comfort," he recalls. I have flown the An-2 many times, you know. There the engine is noisy, but here it rustles. An excellent air conditioning system: warm up if you want, or enjoy the cooling if you want. The vibration is nearly imperceptible, the landing distance is one-half as much, and the takeoff distance is two-thirds as much."

I remember when we were flying in Razdolnenskiy Rayon in the Crimean Oblast, conducting comparison tests of the An-2 and An-3. We were spreading fertilizer on the fields of a sovkhov. In the process we were measuring a great many parameters and watching the fuel consumption per hectare. The "Annushka" was far behind on all points. We tested the agricultural equipment in Krasnodar Kray. The temperature in the freezing weather at that time went under 20 below zero. Pilots spent a whole hour starting the An-2, but I

pressed the button, and it started up. The An-3 starts up easily even at 25 degrees below zero...

The An-3 has many advantages. In addition, it is graceful as well. And how often Oleg Konstantinovich Antonov liked to say that the more attractive an aircraft is, the better it flies.

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CIVIL AVIATION

FLY-BY-WIRE SYSTEMS DEVELOPMENT URGED

Moscow GRAZHDANSKAYA AVIATSIYA in Russian No 3, Mar 86 pp 34-35

[Article by M. Golubeva and V. Zashimov, candidates of technical sciences:
"Taking the Place of Hydraulics"]

[Text] Scientists and designers frequently return to technical solutions and scientific concepts advanced many years ago, but which were ahead of their time and did not achieve acceptance. The "electric" airplane, in which all control and monitoring would be carried out with the aid of electrical devices, should be included among such concepts. Attempts to build such aircraft for military purposes were undertaken as far back as the 1940's. Electrified bomber aircraft were developed in the United States and Great Britain. However, the level of development in electrical engineering then did not make it possible to create systems capable of competing with hydraulic drives.

Both the drawbacks of hydraulic systems, as well as the obvious progress in electronics and computer technology, have become factors reviving interest in electrical drives. And the continuously increasing demands for economy and reliability of aircraft have compelled us to look for new methods.

Just what are the drawbacks of a hydraulic drive? First of all, the low efficiency in power utilization. The source of power in an aircraft--the engine--transforms the chemical energy of fuel into mechanical and heat energy. The mechanical energy for the hydraulic system is drawn from a free turbine or rotor of the aircraft engine through a box of drives connected with a hydraulic pump. The units for taking off the power are complex, and in addition they entail substantial losses of energy. The drive box often complicates work in an engine exchange. Moreover, the narrow specialization of components reduces the equipment's use of capacity and increases the overall mass of the system. This also reduces its efficiency. Difficulty in providing for the system's airtightness and fire prevention and ensuring the cleanliness and quality of the hydraulic fluid also should be included among the drawbacks of a hydraulic drive system.

Improvement in hydraulic systems and hydraulic fluids has made it possible to overcome these problems to a certain extent, so that the hydraulic drive is predominant in current aircraft systems. Nevertheless, certain hydraulic fluids remain highly corrosive at present and have a limited period of use.

In many cases, a composite electrohydraulic drive, in which the control functions are carried out by the electrical system and the function of executing commands is performed by the hydraulic system, is utilized. The features of electrohydraulic drives are similar to the features of analogous electric drives.

The development of large-sized aircraft intensified the hydraulic drive problem: it led to an increase in the length of conduits, complicated their configuration, and increased the number of junction assemblies. This in turn brought about increased hydraulic resistance in the connecting lines, and a system of hydraulic accumulators was required to compensate for this. Making the design more complex and increasing the number of components in it (hydraulic system tanks, dampers), increased the load on the system and made its operation more complicated. Attempts to reduce the size of the conduits and develop a drive which operates under higher pressure (more than 1.5 times as much) in the hydraulic system have proved to entail a number of difficulties. One of them is ensuring airtightness under conditions of vibration and temperature change throughout the length of the conduit, as well as increasing the rate of flow of the hydraulic fluid in the conduit, which can reach 25 meters per second. The quality of hydraulic fluid depends on its temperature, and when it builds up the fire hazard increases.

A number of problems connected with ensuring aerodynamic efficiency in all flight regimes and controllability and stability conditions arise on advanced aircraft with large lifting surfaces. It is becoming necessary to make use of systems providing for a laminar slipstream which flows around the lifting surfaces and systems for artificial damping of aeroelastic oscillations, as well as systems to artificially maintain stability and controllability (active flight control). It is impossible to resolve these problems on the basis of a hydraulic drive. Moreover, as research has shown, with the introduction of an advanced four-dimensional navigation system and complex high-lift devices and the introduction of systems for the direct control of lift, the traditional types of drive are becoming too complicated and should be replaced by simpler ones--electronic and electric ones.

The development of science and technology has established favorable conditions for realization of the concept of a completely electrified aircraft. So achievements in the field of electric materials technology and electronics are crucially important in developing highly economical, highly efficient components and the entire system. In recent years, superlarge integrated circuits and microcircuits which operate on very high frequencies have been put into production. Efficient microprocessors and computers based on them have been developed. Designers have powerful transistors and thyristors, new types of current-conducting materials and transformers, and static current

converters with advanced technical features at their disposal. The samarium-cobalt type of magnetic materials possess magnetic properties that are 10 times greater than traditional ferromagnetic substances. New electric motors in which they are used are significantly smaller in dimensions and mass than the electric motors now in use, but have the same capacity.

In a word, successes in science and technology are making it possible to have servo units in the near future which correspond to the features of future digital and hybrid control systems. On the other hand, the opportunity of developing a powerful on-board electrical network is being presented. The simplicity of transforming electricity and converting electric generators and electric motors makes it possible to simplify the design significantly and to make the system more reliable. According to preliminary estimates, the total capacity which will be required for future aircraft with extensive use of electricity will amount to 60-120 kilowatts, and later on--up to 500 kilowatts. Work is now being carried out to develop on-board electric generators, which are an integral part of the rotor of an aircraft engine. Such generators also can serve as a starter for the engine at the same time.

Obviously, electrical engineering also will have an influence in the improvement of turbofan engines. Powerplants in which the propellers are turned by electric motors supplied from the central on-board electrical network are considered promising.

The use of electricity will make it possible to reduce the mass of an aircraft's structures, which will increase its fuel efficiency. In addition, utilization of systems to provide artificial stability and controllability for an aircraft will make it possible to introduce more efficient aircraft handling conditions, which will save even more fuel than the reduction of mass mentioned.

Finally, electronic and electrical control systems will require less operating expenditures to monitor working order and maintenance compared with mechanical systems having the same reliability. In particular, they provide the opportunity for comprehensive automatic monitoring of the status of all systems both before takeoff and during flight. This, like the multiple redundancy of the electric motors of servomechanisms, are elements of digital technology--a guarantee of better flight safety.

However, a considerable number of technical problems must be resolved for extensive use of electronic and electrical control systems. Reliable protection of circuits and equipment from different kinds of external electromagnetic fields and the electrical charge of lightning, for example. This charge is the most powerful and most often encountered form of external electromagnetic and electrical activity affecting an aircraft and its systems. The importance of efficient and the best protection against lightning also is increased with the greater total length of electrical circuits, the reduction of the operating voltages of semiconductor devices, and the use of polymer--dielectric--materials in the skin instead of shielding metal, as well as the increasing role of electrical systems to ensure flight safety.

Thorough and comprehensive research on the characteristics of electrical and electronic systems will make it possible to make use of their advantages to the full extent.

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CIVIL AVIATION

PRODUCTION, FEATURES OF V-3 SOKOL HELICOPTER

Moscow VODUSHNYY TRANSPORT in Russian 13 Mar 86 p 3

[Article by INTERPRESS especially for VOZDUSHNYY TRANSPORT under rubric "Meridians of Collaboration": "Into the 21st Century in the 'Sokol'"]

[Text] Poland is the seventh country in the world where helicopters are made. There are very high requirements for specialization in their manufacture. For example, the main rotor blades of these powerful aircraft require even more precision in manufacture than the wings of airplanes.

Helicopters are produced in Poland by the transport equipment plant in the city of Swidnik. Their production was begun here 20 years ago under a Soviet license. In years past, the basic design of the Mi-2 helicopter has been continuously improved and adapted to the customers' requirements. The Mi-2 is economical to operate and simple to maintain. Today it is turned out in passenger, transport, medevac, agricultural and several other versions which meet customers' requirements.

More than 80 percent of the output of the plant in Swidnik is exported to many countries, and orders for them come to the plant long before the beginning of the calendar year. Foreign customers value above all the fact that it suffices to order the corresponding complete set of components in order to change the Mi-2 from one version into another, as well as the fact that the manufacturer organizes technical service on the spot.

The plant's collective, not satisfied with just the modernization of a helicopter model that already has been produced, is boldly looking to the future. Today the Swidnik aircraft manufacturers are working hard on a completely new model of helicopter called the "Sokol" (V-3). Since the main customer for the aircraft will be the Soviet Union, the Soviet buyers have set specific technical requirements for the builders of the "Sokol."

"For simpler consultation, the preliminary design was worked out in Moscow," recalls Stanislaw Kaminski, the aircraft's chief designer. "How will the new model differ from its older brother, the Mi-2? The 'Sokol' is nearly 3 tons heavier and a little longer than the Mi-2, it will be able to carry twice as many passengers, and it has a more powerful engine. The aircraft's cabin is more aerodynamic and its speed is higher by 60 kilometers.

"An interesting innovation, compared with the Mi-2, is the availability of an autopilot in the 'Sokol.' In building the helicopter, 30 patented innovations were used," S. Kaminski continues. "It can be re-equipped in medevac, rescue, lifting and transport versions. The aircraft can be equipped as an operating room or a photo lab. It can be equipped additionally with glass epoxy blades, an electronic fuel regulating system, and dust filters for the engine air intake opening, an antivibrator, and so forth."

Tests of the "Sokols" produced in the basic version are now being conducted simultaneously in Poland and the Soviet Union. The results obtained in the course of the tests foretell complete success for the Polish helicopter. Production of the first batch of these aircraft is being planned for 1986.

It appears that demand for this reliable, efficient, and relatively inexpensive aircraft has been assured in Poland, and abroad as well, we think. So let us fly into the 21st century in the "Sokol."

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CIVIL AVIATION

INSTITUTES OBLIGE PLANT TO PRODUCE UNNECESSARY DEVICES

Moscow VOZDUSHNYY TRANSPORT in Russian 25 Mar 86 p 3

[Article by Yu. Saliyenko, chief designer of Civil Aviation Experimental Plant No 20 in Kiev under the rubric "Scientific and Technical Progress Dictates": "We've Become Mired in Yesterday"]

[Text] Our plant depends directly on the activity of scientific research institutes. After all, the plant produces new, original instruments for the diagnostics and monitoring of airborne systems and engines. But specific work by scientists precedes the creation of a new instrument. It is embodied in a document which contains the initial requirements for the future product. And it is necessary for us, the developers, to know that the innovation is technically possible, that it conforms to a current standard, and that there are no similar items in our country and abroad. We should know the maximum cost and the quantity of the items needed by the sector. Requisitions for a new product should come to the plant entrance, let us say, with data such as these. But unfortunately, an immature research concept finds its way through the plant entrance rather frequently for one reason or another. And then...

For example, one of the departments of the "Aeroprojekt" State Planning and Surveying and Scientific Research Institute ordered us to develop an instrument for measuring remaining fuel. But the initial requirements submitted lacked references to similar products and patent research, and there were no documents confirming the possibility of a technical solution for the concept. We had to take on someone else's work. We appealed to the country's leading institutes which are studying ways to economize fuel. And it turned out that the method suggested to us will not ensure the measurement accuracy desired in practice. Here is where we began to wonder: what is the point of undertaking the work? We mention this to the customer, but he has a cogent argument which sounds impressive: "Have you forgotten about MGA [Ministry of Civil Aviation] Order No 154 of 5 August 1981, comrades? It obliges us to engage in research and make a prototype. This assignment is recorded both in our institute plan and your plant plan, by the way."

Where do you go here!

We made a prototype and submitted it to the competent commission. It agreed that the instrument was developed in conformity with the technical assignment, but that it will not produce the results in practice which the sector requires. True, some hope remains, and we turn out a batch of six of the new products and turn them over to aircraft maintenance bases at Borispol, Minsk and Sheremetyevo for operational testing. After some time, the same unfavorable reports come from there: the instrument is unsuitable for use.

What is the result? It took about 2 years to develop the product. The labor of specialists was used to no purpose and a stack of technical specifications which is not needed by anyone made its appearance. In a word, resources were thrown to the wind.

I will cite one more example, but of a different plan. It was connected with the development of a device to record the hours of motor operation in special machinery [spetsmashiny]. And this time the customer, the same GPI i NII "Aeroprojekt" ["Aeroprojekt State Planning and Surveying and Scientific Research Institute], had not made the proper analysis of similar instruments in existence, and the plant specialists had to undertake this. And we explain at once that a similar device exists. Also, it has been turned out by industry for a long time, it is more accurate, and it costs less. All right, we managed to stop in time, as they say...

There is a possibility of being persuaded by these two examples that failing to keep pace with today is more wasteful. Well, should we break ahead, leaving time behind? At first glance, such an objective can only be welcomed, although in practice it turns out that it is impossible to go far alone; we have to wait for those that lag behind. To corroborate this I will cite a request received from a department of the GosNII GA [State Scientific Research Institute of Civil Aviation] headed by N. Belokon to make the "Test" item. We coped with the assignment, although there were very many adjustments in the process of carrying it out.

It would seem that the specialists would be pleased with such success and be proud of such creative good luck. They weren't here! After the acceptance tests, which demonstrated the efficiency of the instruments, representatives of the department stunned plant workers with the finding that it was impossible to put the instrument into use. It turned out that it was impossible not because it was a poor instrument, but because it had been developed prematurely, and scientists had not completed work on where, how and for whom it would be used. But after all, we had invested nearly 40,000 rubles in the item! Just why did this happen? Because the purpose and methods of using the product should be determined in the initial requirements stage, and this was not done. We gave the instrument to the RKIIGA [Riga Order of the Red Banner Institute of Civil Aviation Engineers imeni Leninskiy Komsomol], where they are now occupied with problems that were not resolved in a timely manner.

I cannot help but mention the subsequent incorrect conduct, to say the least, by the customer--the State Scientific Research Institute of Civil Aviation. At first they accused our plant of deviating from the subject matter assigned. This was not successful. Then they suggested that we make a simple little instrument so that they could put a "check mark" in their plans.

Unfortunately, it must be stated that the shortcomings pointed out above have been repeated in formulating the plan for experimental design operations for 1986. The old habits are tenacious, and there is no change to advanced economic thinking. So similar items and patent research are lacking in the initial requirements for the subject "Biotechnical unit for repelling birds," for example. And according to our data, the unit cited will not be an innovation, because similar ones are in series production. Why is this potentially fruitless work needed!

Or the development of an instrument to monitor internal seal failure which is being suggested to us. It is very evident that the same thing will happen with this that happened with the "Test."

If we get at the root, and find the causes of the disappointing lack of coordination in the "institute-experimental plant" tandem, the failure of the sides' interests to coincide may be termed the principal one. What is the institute interested in? To bring a subject up to experimental design work, to obtain a prototype of the product and a series after that, even if only for a half dozen copies. Then a little paragraph in the plan has been covered and a bonus is in their pocket.

And the plant's interests? They are ensuring that a product is economically profitable and technologically advanced, and is produced in a possibly large series. The divergence in views is obvious, and it turns out that the manufacturing plant is the developer, which is interested to a significantly greater extent in the fate of what has been created than the customer.

We cannot struggle against such a manifestation at present. I will say that in any stage of a development, even when it is obvious that it is totally useless, we cannot slow it down and they do not permit it. The customer flaunts the signatures of top managers below the assignment and looks for all the possible arguments of pressure. It should not be that way! If an adverse result is clearly evident, we have no right at all to work toward it. An unneeded instrument without quality is a waste of material resources and the people's labor.

And the party has called upon us to struggle actively for the honor of the Soviet trademark and for product quality, which should be a subject of vocational and patriotic pride.

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CIVIL AVIATION

RUNWAY CONSTRUCTION FOR IL-76 SERVICE TO LENKORAN

Moscow VOZDUSHNYY TRANSPORT in Russian 15 Apr 86 p 1

[Report by VOZDUSHNYY TRANSPORT correspondent G. Pogosov: "They Are Waiting for the Il-76 in the Subtropics"]

[Text] Lenkoran--The silence of Lenkoran was broken by the noises of bulldozers, excavators, graders and pneumatic rollers. In the valley, bordered by the picturesque Talysh Mountains and the emerald green bushes of tea plantations, a runway for Il-76 cargo aircraft has been under construction.

The collective of Road Building Administration No 5 of the republic's Ministry of Highway Construction and Maintenance has laid the first hundreds of cubic meters of gravel for the bed of the road leading to the sky. At the same time, compacting of the plowed soil and construction of a drainage system for ground water runoff is under way. Approximately 1 million rubles of construction work has to be done this year.

In designing the runway, specialists of the Azgospromproyekt Institute made use of a perfected method of rating flexible airport pavements to ensure work of high quality and construction material economy.

"The new runway will be a good present from construction workers for our vegetable growers," said D. Dzhamalova, first secretary of the Lenkoran Gorkom of the Azerbaijan Communist Party and delegate to the 27th CPSU Congress. "This will make it possible to ship 8,000 tons of high-grade fresh vegetables annually and strictly on schedule by Il-76 aircraft from our gardens to the country's large industrial centers. I will note for comparison that this more than doubles the present shipments. Losses of perishable vitamins will be reduced to a minimum, contract discipline will be more strictly observed, and most importantly, owing to the efficient interaction of the airborne conveyer and procurement agents, residents of more than 100 cities in the country will receive appetizing gifts from the subtropics of Soviet Azerbaijan long before their own vegetable crops are harvested."

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CIVIL AVIATION

IL-76TD FLIGHTS TO GRAHAM BELL ISLAND

Moscow IZVESTIYA in Russian 26 Apr 86 p 3

[Report by IZVESTIYA special correspondent I. Andreyev: "The Il-76TD [long-range transport]: A High-Latitude Debut"]

[Text] Graham Bell Island - Krasnoyarsk--An Il-76TD transport has landed at the snow-covered airport on Graham Bell Island, for the first time at such high latitudes. Having landed the heavy aircraft less than 900 kilometers from the pole, it was as if the airmen had brought the 200 islands of the Franz Josef Land archipelago closer to the continent. Honored Pilot of the USSR A. Khalin, chief of the Krasnoyarsk Administration of Civil Aviation, was the aircraft commander on this flight, unusual until now.

"Why was this flight made only now, years after the Il-76 appeared on Aeroflot routes?" Anatoliy Trofimovich Khalin repeated, having invited me to the cockpit after gaining altitude. "There are several reasons here. The first and most important is that only now does this island have available sufficient equipment needed to prepare the snow-covered runway and maintain it in good condition.

"Secondly, after having linked the mainland and the archipelago long ago by an air bridge, the An-12 and An-26 workhorses transported not only machinery, but ground-based navigation equipment, without which it is hazardous to fly and land in the Arctic, to Graham Bell.

"The third reason is the ever-increasing 'population' of Franz Josef Land, its network of large and small weather stations collecting extremely important data on weather in this region of the Arctic, and hence in the entire Northern Hemisphere as well. There are many people, and much cargo of every description. The purely passenger demands for the archipelago are already high. In May we plan to fly out those who have already finished their work in ZFI [Franz Josef Land] or who are going on vacation by Il-18 passenger aircraft. So special fuel additives necessary for greater flight safety for the same passenger aircraft were carried by us in the Il-76. Now polar workers will reach Arkhangelsk or Leningrad, Murmansk or Krasnoyarsk right away..."

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CIVIL AVIATION

YEREVAN AIRPORT RUNWAY IMPROVEMENTS FOR IL-86 SERVICE

Moscow VOZDUSHNYY TRANSPORT in Russian 6 May 86 p 1

[Report by own correspondent G.Pogosov: "Before the Il-86 Is Accepted"]

[Text] Yerevan--Renovation of the runway at Zvartnots Airport is under way. All services are preparing to accommodate the widebody Il-86.

"Runway renovation is proceeding in two stages," says R. Badalyan, deputy chief of the airport. "After extending the strip, we have been working to reinforce it in the second stage. Asphalt concrete is being poured."

Lighting equipment has been replaced for the Il-86 arrival and departure. The landing system has been renovated. Completing these and other operations in the complex will enable Zvartnots Airport to raise its class to operate under ICAO [International Civil Aviation Organization] Category II.

The enterprise's air maintenance base is also getting ready for technical maintenance of the new type of aircraft. Specialists from a number of engineering and technical personnel have been trained, three docks are being installed to accommodate the the Il-86 ground and support equipment, and new stands are being utilized for engine testing.

Flight attendants of the Yerevan Aviation Enterprise are preparing for work on the Il-86 like the major examination of their life. This is what flight attendant G. Vartanyan said:

"Two of our brigades underwent retraining for a month in the training subunit at Vnukovo. We studied the procedure for serving passengers on these airliners, and made two flights each on the routes linking Moscow with Novosibirsk, Simferopol, Sochi and Mineralnyye Vody."

The first step for the aviators of Armenia in familiarizing themselves with the new aircraft will be scheduled flights to Moscow. Flights to Leningrad, Kiev and Tashkent will be planned later.

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CIVIL AVIATION

BRIEFS

Il-76TD ANTARCTIC LANDING--Molodezhnaya Station--An Il-76TD heavy turbojet aircraft landed for the first time 26 kilometers from the Soviet Molodezhnaya Antarctic station on Tuesday, 25 February. Departing Maputo early in the morning with an air expedition on board, the airliner flew 4,785 kilometers across the Indian Ocean and reached the shores of the sixth continent in 6 hours. When the aircraft taxied to the parking area prepared for it near Mount Vechernyaya and shut down the engines, a friendly cheer was heard in the cabin and everyone on the flight began applauding. The Il-76TD aircraft began a new page in the history of mastering the Antarctic on the day that the party's 27th congress began its work. This proving flight marked a new step in the quality of transport service for Soviet Antarctic expeditions. A ceremony was held on the field of snow and ice, with a truck serving as a rostrum. Hero of Socialist Labor N. Kornilov, the leader of the air expedition; R. Galkin, chief of the Soviet Antarctic Expedition; and V. Kiselev, chief navigator of the Ministry of Civil Aviation, congratulated the Il-76TD crew on the successful flight, thanked them for expertly landing the heavy aircraft on a snow-and-ice strip, and thanked everyone who made the strip as well. This day also became a real holiday at Molodezhnaya because the aircraft had brought the latest newspapers and magazines and letters from relatives and friends. But the aircraft had one more test--to try the emergency airfield near the Novolazarevskaya station, 1,390 kilometers from Molodezhnaya, the following day. The airliner crew coped with this task as well. The State Commission accepted both runways at Molodezhnaya and Novolazarevskaya. The Il-76TD took up a heading for Moscow. [By PRAVDA special correspondent V. Chebakov] [Text] [Moscow PRAVDA in Russian 1 Mar 86 p 12] 8936

An-26, Yak-40 YAMBURG SERVICE--Salekhard--The air bridge between polar Yamburg and the mainland has become more reliable. A runway has been put in service for An-26 and Yak-40 aircraft. Until now, the new condensed gas deposits of the Yamal Peninsula could only be reached by helicopter. The opening of passenger and cargo traffic will help the construction and gas deposit workers to provide industrial gas from the new deposits this year. [By V. Kotov] [Text] [Moscow PRAVDA in Russian 10 Mar 86 p 6] 8936

KOSTOMUKSHA-PETROZAVODSK AIR SERVICE--Petrozavodsk--It has been 3 years since the Kostomuksha Mining and Concentration Combine was put into operation in northwestern Karelia. Now its ferrous metallurgy enterprise is well-known in

the country. A well-organized city has been developed adjacent to the combine. It has a Discoverers Street [ulitsa Pervootkryvateley], named in honor of the civil aviation pilots and geologists who opened up the local iron ore deposits. Kostomuksha has been linked with the capital of Karelia, Petrozavodsk, by railroad service, but on the eve of the 27th CPSU Congress, direct air service was opened between Petrozavodsk and Kostomuksha. The first passenger flight on the new 410-kilometer air route was made by the crew of an An-2 aircraft headed by V. Novozhilov. [By VOZDUSHNYY TRANSPORT stringer N. Finogenov] [Text] [Moscow VOZDUSHNYY TRANSPORT in Russian 18 Mar 86 p 1] 8936

KALAIKHUM AIRPORT ELECTRIFIED--Kalankhum--Until recently this airport, situated at 1,630 meters above sea level, was the only airport for the Dushanbe Aviation Enterprise's local air routes which had no electricity. This had an adverse effect on the aviation workers' work conditions and the quality of passenger service. Local party and soviet organs helped to resolve the problem. Resources were sought and the needed number of poles was allocated. Laying out such lines in the Pamir Range has entailed considerable difficulties, and it was the same this time. Digging out the holes for the LEP [power transmission line] poles in the rocky soil involved many problems in particular. But with the help of local residents, for whom an aircraft has become a popular means of passenger service, they also surmounted this difficulty. [By A. Pavlov] [Text] [Dushanbe KOMMUNIST TADZHIKISTANA in Russian 23 Mar 86 p 2] 8936

IMPROVED L-410 FOR ARKHANGELSK--Arkhangelsk, 1 [Apr]--Proving flights of the L-410 aircraft--the latest, most economical version--have been conducted for a month on the oblast's air routes. The new aircraft, made in Czechoslovakia, has a more powerful engine and its load capacity has been increased. Its fuel supply has been increased, which is especially important for operation on the long northern routes. The flights demonstrated the aircraft's good performance and its handling reliability and simplicity. After the tests the pilots of the Arkhangelsk Administration of Civil Aviation began scheduled passenger flights to the polar regions. [By PRAVDA stringer N. Golitsyn] [Text] [Moscow PRAVDA in Russian 2 Apr 86 p 3] 8936

NEW STARYY OSKOL AIRPORT--Staryy Oskol--From now on, the residents of Staryy Oskol can get to the capital of our country in just 1 hour 15 minutes. This has become possible through the opening of a new airport. The airport of the Magnitka of Belgorodskaya [Oblast] now is capable of accommodating Yak-42, Yak-40, An-24 and other comfortable passenger airliners. A comfortable air terminal building, an excellent runway, and ground services provided with the latest equipment to ensure flight reliability and safety are among the obvious advantages of the airport complex. [By IZVESTIYA correspondent V. Kulagin] [Text] [Moscow IZVESTIYA in Russian 4 Apr 86 p 3] 8936

USSR-SWEDEN FLIGHT SAFETY WORK--Stockholm, 9 Apr--Cooperation between the USSR and Sweden in air transport meets the interests of the two neighboring states and is being developed successfully on a long-term basis, Bengt (Johansson), director of Sweden's Central Civil Aviation Administration, told a TASS correspondent in an interview. It has been 30 years since the day that the Soviet-Swedish intergovernmental agreement on air service was signed, he said. Over these years, the volume of passenger traffic has increased substantially.

It suffices to say that about 16,000 passengers were flown just from Stockholm to Moscow last year by Aeroflot and the SAS airline. The activity of the Soviet-Swedish working group on scientific and technical collaboration in the field of flight safety is playing an extremely important role. A number of important documents signed at the group's meeting in Stockholm last December call for further long-term joint research and work with the aim of providing aircraft crews with recommendations for the purpose of improving the level of flight safety. [By TASS correspondent N. Vukolov] [Text] [Moscow VOZDUSHNYY TRANSPORT in Russian 10 Apr 86 p 3] 8936

USSR-PRC CIVIL AVIATION TALKS--(TASS)--Talks were held in Moscow from 7 to 16 April between a delegation of the PRC Main Administration of Civil Aviation and a delegation of the USSR Ministry of Civil Aviation, as well as representatives of certain other Soviet organizations, on questions of expanding collaboration in the field of civil aviation. An arrangement was reached concerning their continuation this year in Peking. The talks, held in an atmosphere of mutual understanding, were frank and friendly. In addition to Moscow, the guests from the PRC also visited Leningrad and Ulyanovsk, where they went sightseeing. [Text] [Moscow VOZDUSHNYY TRANSPORT in Russian 19 Apr 86 p 3] 8936

FRUNZE AIRPORT FUEL DEPOT--Frunze--A fuels and lubricants depot on a rail line has been put into operation at the Manas Airport. A specially built railroad spur line 2.5 kilometers long makes it possible for tank cars with aviation fuel to be delivered directly to the depot. GSM [fuels and lubricants] can be discharged from 12 tank cars at the same time. Tanks for kerosene, gasoline and lubricants have been located on a 12-hectare area. A 30-kilometer fuel line connects the depot on the rail line with the service depot of the Manas Airport. At the same time, fuel is pumped through it without energy consumption. V. Konovalov, chief of the GSM service, and engineers N. Tsarevskiy and O. Dudikov suggested that the natural drop in elevation of 96 meters between the rail line depot and the service depot be utilized. The innovative suggestion was introduced and promises considerable economic gain. Practically all operations have been mechanized. Working conditions have been improved and a considerable amount of vehicle transport has been released. Railroad cars will no longer remain idle. And the safety of the fuel will be maintained reliably. But most importantly, the capacity of the tank farm has been doubled, which facilitates regular provision of aviation fuel for the airplanes and helicopters of the Frunze Aviation Enterprise. With the advent of spring, aviation workers are putting the area of the depot in good order, planting trees and shrubbery and preparing flowerbeds. [By I. Nikulin, chief of the GSM Department, Kirghiz Administration of Civil Aviation] [Text] [Moscow VOZDUSHNYY TRANSPORT in Russian 19 Apr 86 p 4] 8936

YEREVAN-BERLIN AIR SERVICE--A premiere is always a holiday. It is likely that just such a feeling was experienced by each crewmember of the Tu-154 of the Yerevan Aviation Enterprise headed by Pilot First Class V. Parsamyan when it departed for the first international flight to Berlin. Commenting on the event, Yu. Mnatsakanov, first deputy chief of the Armenian Administration, noted that the opening of the new route was brought about by that great interest displayed in the German Democratic Republic in the achievements of Soviet Armenia, its ancient history and culture. Every year thousands of

tourists from our republic familiarize themselves with the points of interest in the fraternal country. Flights will be made weekly. At the beginning of June, Armenian aviators are to open one more international route, Yerevan to Prague; there will be one flight weekly on this route. The opening of the Yerevan-Berlin-Yerevan route coincided with completion of the renovation of the international section of Zvartnots Airport. The throughput capacity of these "gates of friendship" has been increased, the operations room has been expanded, and more comfortable conditions have been created for foreign and Soviet tourists. [By P. Georgiyev] [Text] [Moscow VOZDUSHNYY TRANSPORT in Russian 24 May 86 p 3] 8936

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MOTOR VEHICLES AND HIGHWAYS

DETAILS OF GIMRINSKIY HIGHWAY TUNNEL CONSTRUCTION

Moscow TRANSPORTNOYE STROITELSTVO in Russian No 2, Feb 86 pp 26-27

[Article by candidate of technical sciences G.Ya. Gevirts and engineers I.E. Budayev and V.L. Chelnokov (Lengidroyekt): "Gimrinskiy Highway Tunnel"]

[Text] The use of progressive configuration and design solutions in planning the Gimrinskiy Tunnel made it possible to reduce considerably the estimated cost of construction.

The presence of a drainage and ventilation adit located parallel to the tunnel made it possible to resolve a series of problems successfully, including ones such as:

- using a progressive operational ventilation plan;

- defining more accurately the conditions of tunnel construction and coupling typical design decisions to actual conditions;

- the possibility of expanding the front of the tunnel work when tunneling at a reduced rate due to worsening of engineering and geological conditions;

- using an advanced tunneling ventilation plan.

The Gimrinskiy Highway Tunnel is being constructed on an access road to the Irganaysk Hydraulic Power System. This is one of the longest highway tunnels in the Soviet Union. This structure will provide the shortest and most trouble-free transportation link, regardless of the weather conditions, to the Irganaysk Hydraulic Power System being built. The tunnel is of great importance for developing the entire economy of Dagestan ASSR since it provides the shortest link of nine rayons of mountainous Dagestan with the center of the republic and with the railroad.

The tunnel crosses the Gimrinskiy mountain range from north to south. The path of the tunnel passes across a strike of rocks and crosses limestone, marl, and sandstone with interlayers of clay, aleurolite, and argillite. The compressive strength of the rock in a water-saturated state is between 30 and 110 MPa.

The ground water outlets in the form of individual sources and their position in the wells at portal sections gave reason to assume that the tunnel route will be considerably innundated with water. Dynamic forms of rock pressure manifestation are possible on the preliminary enclosure on a large section of the tunnel route. The presence of organic inclusions in a sector of the route about 500 meters long and in argillite does not rule out the possibility of a slight release of methane. The seismicity of the area of tunnel construction is in the range of 7-8 points.

By its location in plane and profile, the tunnel is a typical mountain-pass tunnel with an inverted-V vertical alignment toward the portals. The route of the tunnel is straight and has curves only at the portal sections, providing the most favorable joining of the tunnel with the highway. The radius of the curves is 1200 meters for the purpose of providing the best visibility in the tunnel and standardizing the tunnel cross-sections by avoiding expansions at the curves.

An important question in planning the tunnel, determining the design and dimensions of the cross-section, was selecting an operational ventilation plan which would ensure removal of exhaust gases during heavy motor transport traffic. As a result of studying and comparing various plans, a lengthwise and transverse ventilation system was adopted.

With this system, clean air is fed into the tunnel through a drainage and ventilation adit parallel to the tunnel and ventilation connectors located 600 meters apart over the length of the tunnel. The flow of clean air into the tunnel is controlled by using regulating valves installed in the ventilation connectors. The air polluted with exhaust gases travels lengthwise along the tunnel from the middle to the portals or, in instances when it is feasible to use the effects of natural draft and wind pressure, along the entire tunnel towards one of the portals. Ventilation plants are located in underground situated at the ends of the tunnel. Fresh air intake is provided through shafts from the side of the portals. The system developed is sufficiently maneuverable, providing automatic regulation of the air flow into the tunnel, and makes it possible to reduce electrical energy consumption for ventilation substantially.

Studies conducted by the Ventilation and Labor Protection Department of the Leningrad Mining Institute confirmed the reliability and efficiency of this operational ventilation system.

Thus, the following complex of tunnel structures was determined: the highway tunnel itself; the parallel drainage and ventilation adit; ventilation connectors between the tunnel and the adit; air intake shafts of the north and south sections; two ventilator chambers; auxiliary chambers and recesses; the north and south tunnel portals with maintenance service buildings.

The lengthwise and transverse ventilation system made it possible to decrease the tunnel cross-section area; provide the best seismic stability of the structure due to the simplicity of construction and the absence of reinforced concrete partitions and overhead covers of ventilation ducts which have to be

airtight; reduce the period of construction; decrease labor intensiveness; and improve the tunnel's operating conditions.



Figure 1. Plan of Gimrinskiy Tunnel: 1-highway tunnel; 2-drainage and ventilation adit; 3-connector; 4-emergency stop chamber; 5-ventilation chambers; 6-ventilation shafts.

Engineering and geological conditions along the tunnel route and the desire to make the maximum use of the supporting power of the rock mass determined the two basic types of tunnel lining construction: monolithic concrete (or reinforced concrete) and composite, consisting of reinforced concrete roof bolting and sprayed concrete.

Using reinforced concrete roof bolting and sprayed concrete as lining members makes it possible to reduce substantially the specific consumption of materials for the linings, decrease labor costs, reduce the construction time, and reduce the cost of 1 meter of tunnel by roughly 25 percent. Presently the Lengidroyekt (Leningrad Planning, Surveying, and Scientific Research Institute), the scientific research department of the Gidroyekt (All-Union Planning, Surveying, and Scientific Research Institute), the LIIZhT (Leningrad Institute of Railroad Transportation Engineers), and the Orgenergostroy (All-Union Institute for the Planning of Electric Power Projects) are jointly conducting full-scale, model, and theoretical studies aimed at further improving the designs of the tunnel linings taking into account the actual engineering and geological data obtained in the process of driving the tunnel.

The overall plan of organizing work for construction of the tunnel was determined taking into account the following facts.

The tunnel is being constructed during the preparatory period of building the Irganaysk Hydroelectric Power Station; therefore, performance of underground work must be supported by independent facilities located near the portals.

The great depth of embedding and the relief of the terrain, characteristic for mountain-pass tunnels, practically precluded the possibility of organizing lateral construction approaches along the route by using auxiliary shafts or horizontal workings.

Insufficient study of the engineering and geological conditions over the tunnel route required a considerable amount of surveying work to be done in the process of construction with simultaneous coordination of the design decisions with a model and caused advanced driving of the drainage and ventilation adit.



Figure 2. Design of the north portal (architect A.N. Vasilyev).

The tunnel is being constructed in three stages by the Chirkeyskiye Specialized Department of the All-Union Association Gidrospeksstroy (State All-Union Trust for the Reinforcement of Foundations and Structures of the Glavgidroenergostroy). In the first stage, during the period of preparatory work, they constructed temporary access roads to the areas of the portals and portal facilities. Simultaneously they worked excavations near the portals. The second stage includes the basic underground work—tunneling and concreting the linings. The final stage calls for erecting the roadway, adjusting the operational ventilation system, equipping the tunnel with signalling and communications equipment.

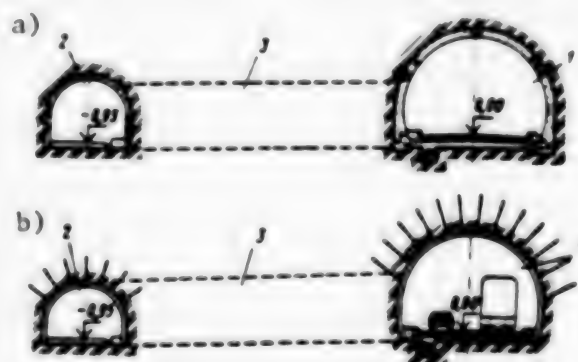


Figure 3. Cross-section of tunnel: a—with monolithic concrete lining; b—with combined lining of reinforced concrete roof bolting and sprayed concrete; 1—highway tunnel; 2—drainage and ventilation adit; 3—connector.

Tunneling began at the portals using the continuous face method. Concreting of the linings is done parallel with the tunneling, lagging 200-300 meters behind. Pioneer cutting of the drainage and ventilation adit, constantly staying at least 300 meters ahead of the tunnel face, makes it possible to

organize additional faces in the tunnel in case the rate of advance of the main faces slows down due to deterioration of engineering and geological conditions.

Forward test holes are drilled in the faces of the adit, including taking cores, for studying the natural stressed state of the rock and ensuring safe conditions during construction of the tunnel. Drilling holes also makes it possible to secure against sudden outbursts of water into the working and to check the gas content of the rock.

Construction of the Gimrinskiy Tunnel is being done from the portals by driving from both ends. Under these conditions, ventilation of the workings during construction requires special attention. The presence of the drainage and ventilation adit running parallel to the tunnel has made it possible to use an advanced pipeless tunneling ventilation plan, envisioning the use of sections of the completed parallel workings as ventilation channels. In particular, the drainage and ventilation adit is used to feed fresh air to the faces, and the polluted air is removed through the tunnel. The essence of the proposed system is that the main ventilation plants located at the portals of the adit force fresh air into it. Local ventilation fans installed in the fresh air stream in the adit force air through metal ducts into the face zone of the tunnel and adit. As the next 300-meter section of the adit and tunnel (between connectors) is driven, the local ventilation fans and air ducts are moved, thus clearing that section for work on concreting the lining.

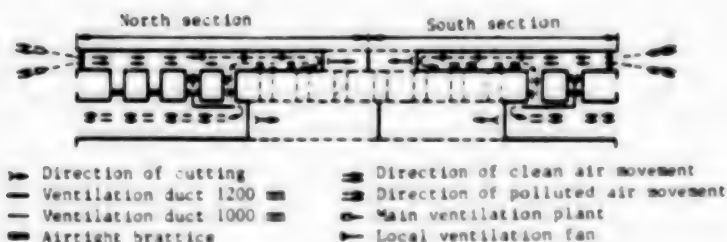


Figure 4. Diagram of pipeless tunneling ventilation of the works.

Compared to traditional forced ventilation of faces, the pipeless system makes it possible to gain a substantial savings in sheet steel, decrease the installed capacity of ventilation plants, lower electrical energy consumption and operational costs, and improve conditions for working on concreting linings and completing construction of the tunnel. Under certain conditions, operational ventilation plants may be used as the main ventilation plants.

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CONTAINER HANDLING TRUCK FROM KURGAN BUS WORKS

Moscow AVTOMOBILNYY TRANSPORT in Russian No 2, Feb 86 p 44

[Report: "Container Handling Truck from Kurgan Bus Works"]

[Text] The Model 7806 container handling truck is produced by the Kurgan Bus Works. This vehicle is designed for loading and unloading operations and for short-distance transport of lengthy objects as well as for moving heavy containers about on open storage lots at industrial enterprises, major container points, and ports.

The container handling truck can be operated in ambient air temperatures from plus to minus 40 degrees C on open-air lots with concrete surfaces, the slope of which does not exceed 2 degrees. The load-lifting attachment of the vehicle consists of a frame and forked carrier arms.

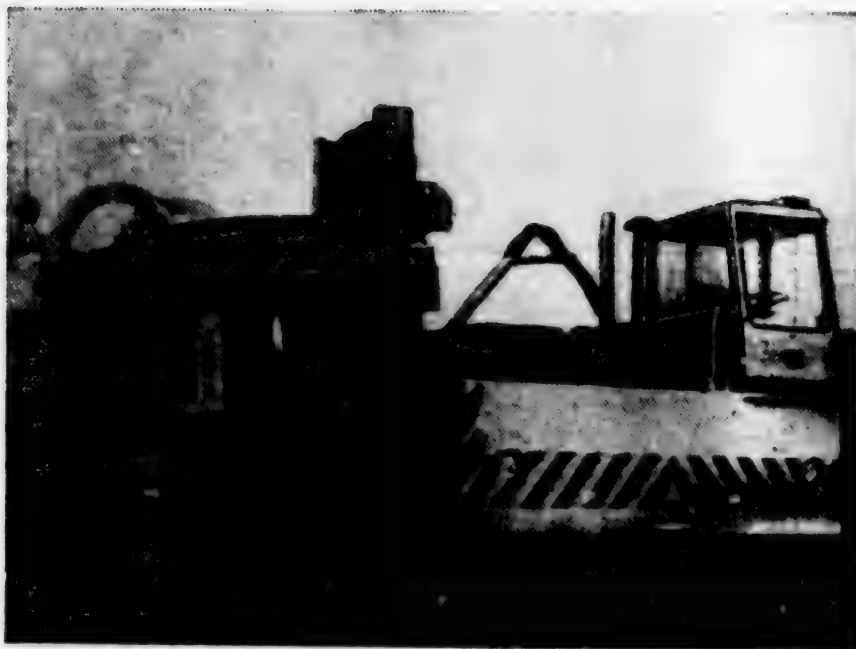
The vehicle has good maneuverability. The YaMZ-238 engine which produces 176.5 kilowatts (240 hp) and the hydraulic transmission provide it with good dynamic qualities. The container handling truck is safe to operate. This is achieved by the use of extension supports and an electric interlock which ensures the necessary procedure for switching-on the mechanisms (setting up the supports, extending the load-lifting device, and raising the extension supports).

The large areas of the extension supports create the very same specific pressure on the ground as do the wheels (all of them are paired on the vehicle); therefore, it is not necessary to construct special covering strips on the storage lots.

The operator's cab meets contemporary requirements for ergonomics, provides convenient controls for the operator, has good visibility, and is well-heated. Electro-hydraulic control of all mechanisms on the container handling truck makes it easy to operate, and reduces operator fatigue.

The chassis framework is made of low-alloy steel, and is completely welded.

Strengthening the grasping framework on the boom permitted reducing the height of the vehicle. Thanks to this, it can be transported by rail without disassembly, as, let's say, the BelAZ truck does.



The Model 7806 container handling truck is capable of lifting a 25,000 kg load on its forked carrier arms, and 20,320 kg on the container frame. The forked carrier arms can raise a load to a height of 4 meters, and the container frame to a height of 5.2 meters. The distance from the center of gravity of the load to the front wall of the fork is 1.25 meters. The fork can be inclined upwards 6 degrees and downward 4 degrees. The load lifting speed is 13.5 meters per minute.

The maximum speed of the container handling truck, unloaded, is 40 km/hour. Its turning radius is 7.8 meters. The vehicle's dimensions are 8,215 X 3,700 X 5,700 mm (with the lifting device elevated). Its base is 4,720 mm; the wheel gauge is 2,400 mm for the front wheels and 2,840 mm for the rear; minimum road clearance is 250 mm. The vehicle is capable of overcoming a slope of up to 8 degrees. Fully-equipped, the vehicle weighs 37,600 kg.

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URAL-5920 ALL-TERRAIN TRUCK

Moscow AVTOMOBILNYY TRANSPORT in Russian No 2, Feb 86 p 45

[Report: "The 'Ural' Snow and Swamp Vehicle"]

[Text] The Ural-5920 amphibious all-terrain transporter is designed for hauling various kinds of national economic loads along previously-surveyed routes in swampy or water-soaked territory, across the snow where there are no roads, and also on dirt roads.

The chassis of the all-terrain vehicle [ATV] has two tracked bogies. The tracks are made of rubberized metal. The front bogie has six each supporting bogie wheels on rubber tires, and the rear has eight. Cranes, excavators, tanks, and special cabs can be mounted on the Ural's chassis.



The Ural-5920 utilizes a maximum of standardized components and parts from vehicles in serial production at the Ural Motor Works. The cargo capacity of the ATV is 7,500 kg when equipped with a hoist; without the hoist it is

8,000 kg; and the chassis is capable of supporting 9,000 kg. Overall weight of the ATV is 22,510 kg; its dimensions are 9,900 X 2,870 X 3,090 mm; the base (the distance between the geometric axes of the supporting-turning mechanism) is 4,500 mm; the wheel guage is 1,900 mm and the width of the tracks, 970 mm.

A fully-loaded ATV creates an average pressure on the road surface of 0.244 daN/cm² [possibly, standard atmospheres]. Its minimum road clearance is 415 mm, and the height of the truck bed is 1,630 mm.

The Ural-5920 is equipped with the KamAZ-740 diesel engine. With this engine a fully-loaded ATV develops a speed of 30 km/h on the highway. Under these operating conditions, rated fuel consumption is 100 ltrs/100 km.

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MOTOR VEHICLES AND HIGHWAYS

MINISTRY PLANS MORE VEHICLES FOR FAR NORTH, SIBERIA

Moscow IZVESTIYA in Russian 10 Mar 86 p 2

[Article by V. Popov under the "From Authoritative Sources" rubric: "Vehicles for the North"]

[Text] The USSR Ministry of the Automotive Industry has resolved to increase the production of northern design cargo vehicles and buses in the current 5- year plan by five times. A large part of this automotive equipment will operate on the roads of the Western-Siberia oil and gas complex.

Our correspondent met with Doctor of Technical Science Z. Sirotkin, deputy director of the Central Scientific-Research Automobile and Motor Institute.

[Question] You were in Tyumen Oblast. Can you tell of your experience concerning how automotive equipment operates in the harsh Siberian krays, and your opinion of transportation support of those persons working in the oil fields?

[Answer] My impressions are contradictory. Of course, the overall success of the oil and gas workers also depends on the efficiency of the motor transport workers. However, the conditions in which they must drive the vehicles are very difficult. We who build the vehicles are really indebted to the Siberian drivers.

Often, the sole road in the middle of the boundless swamp is a wooden one, every log of which "rattles the bones" of the vehicle. At times, the vehicles do not withstand this harsh examination and turn out to be insufficiently firm and work capable.

Amazingly, there are many models on the local roads: there one can encounter practically all trucks produced by our plants. Because of such "variegation", naturally, there is difficulty in supplying spare parts and repairs.

We have now recommended for the region a series of automotive equipment which corresponds more to the road and climactic conditions. Of course, we were advised by those who will use this equipment--representatives of USSR

Ministries of the Petroleum Industry, Gas Industry, Petroleum and Oil Construction, and Geology. In my view, there are also mistakes by the planning organs in the distribution of automotive equipment around the country. There are clearly an insufficient number of vehicles of the northern design in Tyumen. This year the Ministry of the Automotive Industry is stepping up the output of those vehicles which correspond more to Siberian conditions and is preparing several hundred additional various vehicles especially for the oil workers of the region.

[Question] How do you intend to increase the reliability of the equipment?

[Answer] The plants, in particular, have been ordered to modify the construction of their vehicles and to eliminate the problems which occur during use.

It was resolved that now work must be done in the oil industries of western Siberia primarily with vehicles of northern design. Moreover, they all will be equipped with a number of additional equipments which ease the drivers' work. Most importantly, there are automatic heater-preheaters which allow rapid engine starting in severe frost and which reliably heat the cabin (vehicles did not have these previously). The vehicles will have an improved thermally insulated cabin equipped with an electrically heated windshield.

The output of completely automatic dump trucks with beds heated by exhaust gases will be mastered: this will make it possible to dump a load of dirt frozen on the outside.

Much also depends on the sub-contractors who deliver various materials and completed products to us. For example, a single modern vehicle now requires about 2,000 items of rubber products alone. If these various membranes, gaskets and seals operate normally in moderate climactic conditions, they quickly become inoperable during the Siberian frost. There are many cases when a vehicle was laid up due to the lack of a single fan belt.

The USSR Ministry of the Petroleum Refining and Petrochemical Industry produces an insufficient supply of winter-resistant tires. Due to the lack of these, a more reliable "northern" vehicle stands idle. A vulcanized rubber is required which can withstand frost to minus 60 degrees. We also desire that petrochemical engineers more quickly establish the production of universal lubricating materials, which operate reliably in various sub-assemblies of the vehicle under low temperatures.

A vehicle, like a human, loves warmth. With the increase of northern design vehicle production, we need ever more batteries with heaters. More reliable heaters and glass with a conductive coating are needed.

[Question] The Siberian oil field workers also have problems with the repair of automotive equipment. How can you and the automobile builders help in this matter?

[Answer] As a matter of fact, we are already beginning to render assistance. Now factory maintenance of Western Siberian transport is being introduced with

spare parts for the vehicles used by the oil field workers. Our plants will now accept from the oil field workers sub-assemblies and assemblies requiring major repairs and repair them at their plant. For this purpose, special repair shops and sections are being created at the ZIL, GAZ, BelavtoMAZ, AvtoKRAZ and other enterprises. In Surgut a post has been organized (later a special automotive center will be built) for supplying oil field workers' enterprises with spare parts and to exchange old and worn out sub-assemblies for ones already rebuilt under factory conditions.

[Question] Earlier you spoke of vehicles, the production of which has been mastered by industry. How is the matter of new equipment specially for the needs of the oil field workers in West Siberian region progressing?

[Answer] It has already been created. Recently, the construction of several such vehicles was discussed at the ministry's scientific-technical council. Moreover, the matter concerned two new MAZ tractor-trailers with 65 and 100 ton carrying capacities. These giant tractors will have engines with a capacity of up to 650 horsepower. They are designed for transporting heavy structures, and drilling, gas compressing stations and other such assemblies which cannot be broken into smaller parts.

The production of several vehicles is also scheduled at the Kremenchug plant. They include a tractor capable of transporting three 12-meter long, wide diameter pipes with an average weight of 25 tons. The tires of the vehicle are low-pressure balloon-type. For better maneuverability, it was ensured that the trailer will go directly along the track of the tractor.

There is another KRAZ with such a carrying capacity and it has a semi-trailer platform for various technical equipment, tractors, cranes and large house building parts.

The Urals Automobile Plant provided for the production of a tracked swamp-mobile vehicle with an eight ton cargo capacity. They are designed for transporting people and various equipment in conditions of complete roadlessness.

Also planned are the production of heavy fuel trucks capable of carrying 24,000 liters, isothermal trucks and other special vehicles. Practically all our leading plants are actively participating in full-fledged transport supply for the oil field workers of western Siberia.

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16 July 1986

MOTOR VEHICLES AND HIGHWAYS

QUALITY PROBLEMS, LABOR SHORTAGE AT KAZ WORKS

Moscow TRUD in Russian 14 Mar 86 p 2

[TRUD correspondent O. Chikhladze report under the "Following Criticism from the Rostrum of the Congress" rubric: " 'Kol'khid' Will Have a Good Name--Say Workers at Kutaisi Automobile Plant"]

[Text] Kutaisi. In a speech at the 27th CPSU Congress, Delegate V. Ya. Gorin, chairman of the Belgorod Oblast Kolkhoz imeni Frunze, said, in particular, that the Kutaisi Automobile Plant [KAZ] delivered 50 defective vehicles during the last year which had to be returned...

On the morning of 5 March, when I first learned from the newspaper about the criticism of our plant at the congress, everything was very awkward. However, frankly speaking, it was not unexpected to me.

Actually, back in June of last year, a veteran of the plant, Hero of Socialist Labor Test Driver B. Vashakidze, spoke in an open and direct worker's way at a guest conference of the Kutaisi Party Gorkom on the low quality of automobiles being produced. At that time, they attempted to adopt measures to improve the quality of production.

A complaint came from Belgorod at the end of last year, recalls A. Tukvadze, chief of the assembly and testing shop for the KAZ-608V automobiles. Having analyzed our work, we came to a conclusion which led us primarily to the press and forging building and assembly area, from which we receive more than one half of all parts and subassemblies. We took measures to improve the work of these shops and made several changes in the construction of vehicles. In particular, our specialists suggested strengthening the chassis and also strengthening the rear spring supports. However, of course, the adopted measures did not fully remove the acuteness of the problem. Criticism from the high rostrum painfully touched everyone and forced them to review their relation to the matter.

At the plant today, literally every aspect is undertaken with the attitude of putting it in order. Control over the press and forging shop has been strengthened. The chassis produced by this shop earlier gave rise to ever more frequent and unfavorable criticism, and not surprisingly: quality

control covered only five percent of the finished products, now all chassis and component parts are tested. A group of workers specially created for this task rectifies the defects and flaws which are detected.

The first results are given in the authors's month-long surveillance over the quality of finished parts and subassemblies begun on Monday, 10 March. Designers and engineers spend a large part of the workday in the shops preventing deviation from All-Union State Standard requirements. In the same press and forging shop it was revealed, for example, that some heavy presses had lost their accuracy due to prolonged use. Urgent measures were adopted to to repair them. Many other deficiencies have been or are now being removed. Information from the shops flows on a main conveyor to an organized, special headquarters which has the authority to immediately resolve all matters concerning quality. A two-stage control procedure has been made available to the headquarters in the assembly and testing shop for the inspection of finished tractors, and they are also immediately tested by chief of the shop's bureau of technical control.

Why are there failures nevertheless? It is explained (but not justified) at the plant in the following manner. For the last 5 years, there has been reconstruction going on here which created the capacity for the production of the tractor-trailer KAZ-4540. This is the first domestic vehicle production of a transport-commercial grade vehicle for agricultural use. The tractor-trailer can operate in road-less conditions with 11 tons of freight. The construction of the capacity for the production of the tractor-trailer was a matter of special state importance. When serious difficulties arose in the middle of last year on the construction of buildings and assembly equipment, the enterprise's leadership's interest on the production of the old tractors waned. This is an instructive example of the inability to consider the solutions to present and future tasks.

We emphasize that today the failure is doubly instructive. One cannot allow such a thing to happen again. The fact is that the Kutaisi's are experiencing a most serious shortage of qualified personnel. There is a danger that this will also reflect on the quality of the new tractor-trailers. The qualifications of the personnel will not rise if their fluctuations are not removed. This can only be stopped through energetic measures for the social development of the personnel. One of the most urgent problems is housing. This information, received from the professional committee: about 2,600 automobile plant workers' families are in line to receive an apartment. At the planned rate of housing construction, all persons requiring housing will not be satisfied for 16-18 years. But next door, there are enterprises where the time required to receive living quarters does not exceed 5 years... The USSR Ministry of the Automotive Industry cannot leave this out of their reckoning. In proportion to the mastery of the new capacities, more and more highly qualified personnel are required. This matter must be considered in a timely manner.

Recently, I talked with many plant workers, engineers and enterprise leaders. All have the same attitude: the answer to the matter is in the personnel.

Labor exactingness has been increased. I feel it as I sit behind the wheels of new vehicles coming off of the conveyor today, says test driver B. Vashakidze, who had raised the question already last year of production quality. I am certain that "Kolkhid" will have a good name.

MOTOR VEHICLES AND HIGHWAYS

OKA SUBCOMPACT DEVELOPMENT, PRODUCTION PLANS

Moscow IZVESTIYA in Russian 31 Mar 86 p 3

[Article by IZVESTIYA special correspondent A. Blokhnin under the "Problems" rubric: "'Oka': The Way to the Conveyor. New Automobile in Demand"]

[Text] Moscow--city of Brezhnev. Several months ago (IZVESTIYA No. 202 of 1985), the newspaper acquainted the readers with a new subcompact car [mikroavtomobil], the "Oka". The story of the exceptionally economical, promising and inexpensive automobile evoked numerous responses. How is the production preparation of the automobile of an especially small class proceeding, the type of which has never been produced by domestic industry? This question was asked in several hundred letters which came to the editors after publication of the report of the Oka in the Zhiguli family. To answer this question, an IZVESTIYA correspondent met with the creators of the subcompact, and talked with the manufacturers and workers of the Ministry of the Automotive Industry.

As reported, the Oka is the fruit of the combined efforts of three enterprises. The main author of the construction and general component decision is the Volga Automobile Plant. Engineers and designers of KamaZ developed the sub-assemblies of the power plant, the steering system and the technological production of body parts. Specialists of the Serpukhov plant, which produces motorized carriages for invalids, ensured that people would be comfortable in the subcompact car. Good cooperation sped up the appearance of the nimble Oka (it is true that workers from the Kama Automobile Plant call it the Kama, and not without justification), and the synthesis of the Volga and Kama automobile plants' know-how promises a corresponding quality to current demands.

Back in the beginning of the 11th 5-Year Plan, suggestions appeared at the KamaZ for organizing added production for domestic demand, corresponding to the high technical level of the plant. They remembered the unfulfilled alliance with the Polish automobile builders which was supposed, in due course, to deliver heavy-duty assemblies to our country for the subcompact FIAT-126P. Now it has been decided to plan our own automobile, relying

primarily on the great experience of the VAZ, and using its technical and construction potential. Up to now, test models of the Oka have already wound up many tens of thousands of kilometers on their speedometers. The focus of the design work has changed to the area of production preparation.

One of the bays of the so-called testing building at the KamAZ was almost completely emptied of factory equipment located there for the capital repair of Kama truck engines. The remodelers are moving into the new bay and 12,000 square meters of production space which belong to them are set aside for shops where the Oka will be born. V. Grachev, the chief of the plant's light automotive assembly shop of the Kama union, says on their future possession: In the bay which we have acquired we are organizing mechanical development and assembly sections. A main conveyor for the Oka will also be built here. Our plant for the production of the Oka alone is ordering more than 500 individual pieces of equipment. These are modern numerically controlled machine tools and automatic lines. A technological department was created. We are contracting workers, who come for probationary work, on machine tools similar to the basic production ones at the KamAZ. Personnel for the managerial sections are being sought with exclusive consideration given to the redistribution of the forces of existing departments and management.

The decision to produce the Oka was made in the middle of last year. By the end of the second year of the 12th 5-Year Plan, production runs of subcompact cars will come off of the conveyors. The duration of the mastery of production is very compressed.

In the first stage, says KamAZ Technical Director N. Volosov, we will have to conduct assembly, welding and painting in various locations, and in areas which are being freed up for us. But even under these conditions, all operations will not be accomplished according to interim, but permanent know-how, and on primary equipment. Within one and a half to two years Oka will celebrate its new home in a building constructed especially for it, which is now planned. According to the agreement worked out by the KamAZ, the plan is to assemble the subcompact car at all three enterprises--KamAZ, VAZ and in Serpukhov. The primary equipment of the assembly conveyors will be prepared by the Kama automobile builders.

The "baby" Oka attracted the attention of hundreds of engineers, and posed thousands of technical questions which must not just simply be analyzed, but also the need to change the psychology of people, who have become accustomed to dealing with multi-ton trucks, must be considered. Parts for the Oka demand stricter tolerances, and a "truck" measurements approach is not permissible in finishing them.

The engineer's prestige is determined not by the measure of the automobile, I. Smirnov, chief designer for light vehicles, said to me (the KamAZ now has such a position). The development of the construction and organization of the production of a new model is the main measure of engineering maturity. Perhaps our attitude toward the subcompact is very serious for this reason. Moreover, we are not simply making a new model, but an automobile which the country has never had. At the present time, the buyer has practically no choice: all cars (with the exception of the Volga, which, by the way, is

being sold to the public in extremely limited numbers) are of approximately one class. With the appearance of the Oka, a new Zaporozhets and a Moskvich, a choice, of course, appears. The Oka belongs to the especially small class of the first group, and the new Zaporozhets (whose engine displacement volume is somewhat smaller than the contemporary model) belongs to the especially small class of the second group.

Low price and economical operation in a subcompact car influence the buyer. Automobile builders say, with good reason, that the price of gasoline dictates the fashion. It is no accident that when the energy crisis seized the Western countries, many firms very quickly organized the output of subcompact automobiles. For us, economical operation of an automobile also has a direct relationship not only with the pocket of the owner, although it is very important. In conditions when the saving of fuel and energy resources is declared a national program, the question of which automobiles to produce must obviously be considered in this aspect.

Statistics confirm that the cargo coefficient of private 5-seat automobiles equals 1.2. This means that together with the driver there are on the average 0.2 passengers riding in these cars. Gasoline is wasted in vain on the empty seats and the transport of the automobile's own weight for hundreds of kilometers. Even in countries where there is a high degree of automobile availability, the production of very small cars (up to 2-seaters), which use less fuel than motorcycles, has not stopped. The Japanese, for example, produce a two-seat automobile with a one-cylinder diesel motor. It requires 2 liters of solar oil for a 100 kilometer trip!

Can we really do something like that? I asked Smirnov.

In principle, there are no technical obstacles.

However, we will return to the Oka. Speaking of the production run of this car, we must sharply change the focal point of the majority to date. There will be 20,000 cars produced each year at the KamAZ, and just as many at the VAZ. In Serpukhov there will be 10,000 prepared for invalids. Why so few?

We have already said that the KamAZ needed the subcompact to "complete" a plan for mass production. It also turned out to be a child's game for the VAZ. The standard Zhiguli became the basic product, and the Oka seemingly is not the mass production automobile. However difficult, it is all the same to the automobile: the tires, doors, motors and seats are all there. The legal status has not yet been decided.

However, the most essential point is that the VAZ does not need the Oka in the current production run. The net price of the nimble car will be even higher than the standard Zhigulis. This will be a direct burden for the plant, which is operating under the conditions of an economical experiment, but whose main principle is profit.

The demand for a subcompact like the Oka at this moment, according to specialists, is at a level of 400-500 thousand cars per year.

If one examines the forthcoming output of the Oka by the VAZ and KamAZ in tandem solely as a test connected to the development of the construction, refinement of the technology, and a broad test of utilization, and at the same time, with the perspective of increasing output, then everything is in order. On the other hand in fact, we very quickly encounter the result of new shortages, and new and painful consumer stress.

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MOTOR VEHICLES AND HIGHWAYS

BRIEFS

Kamaz ENGINE PLANT IMPROVEMENTS--Yaroslavl--The diesel equipment plant built as a companion to the KamAZ [Kama Motor Vehicle Works] is a new enterprise, furnished with modern equipment, high-speed lines, and advanced technology. However, renovation already is being begun in its shops--the first flexible automated production, robotized units, is being set up. Only machinery without persons, without creative mastery of its capabilities, costs a little, you know. Collectives working under the brigade method have become a good school at the plant for increasing skill and an additional resource for accelerated mastery of the capacities. The collective is faced with important tasks in this five-year plan as well. The output of diesel equipment has to be increased by 1.5 times as much. At the same time, by modernizing production, the plant is significantly renovating the product as well--developing in turn more economical fuel units for KamAZ engines and equipment for motor vehicle engines of the Gorkiy, Kutaisi and other motor vehicle works. [By A. Mikheyev, leader of a complex brigade of the diesel equipment plant] [Excerpt] [Moscow SOVETSKAYA ROSSIYA in Russian 9 Mar 86 p 1] 8936

NEW ZIL PLANTS UNDER CONSTRUCTION--In the city of Yartsevo, 60 kilometers from Smolensk, one of the largest industrial construction projects in the center of the RSFSR has been under way. Two plants--an iron works and a diesel engine plant, which will be included in the ZIL [Moscow Motor Vehicle Works imeni Likhachev] association--are being erected here at the same time. Construction workers and assemblers now are working particularly intensively on the construction start of the year--the first section of the iron works. "We have to put capacities in operation to turn out 60,000 tons of castings," says V. Kanishchev, director of the Yartsevo enterprise. In addition, I want to emphasize two features of the construction project in keeping with the time. Firstly, social and cultural and personal service projects are being erected simultaneously with the industrial construction. The second distinctive feature is the technological "coordination" of the plants. The cutting scrap from the diesel plant takes the place of about 20 percent of the iron works' imported raw material. The Basic Directions stipulate that the production of diesel trucks and truck trains is to be brought up to 40-45 percent of the total output. In 2 years, when the enterprise begins operation, we will make our contribution to fulfillment of what has been outlined: we will begin delivering tens of thousands of engines to the ZIL assembly conveyor line. Attention at the site today is focused mainly on the construction start. [By M. Larina] [Excerpts] [Moscow IZVESTIYA in Russian 17 Mar 86 p 1] 8936

SMOLENSK AREA LNG STATIONS--Smolensk--A gas-filling compressor station for motor vehicles has begun operation in a Smolensk suburb. It can refuel 500 vehicles per day. Instead of gasoline, vehicles are filling up here with compressed natural gas. Another four such gas-filling stations will be built in the Smolensk area. Two of them, in Safonovo and Prigorye, will begin operating in 1987; two others in Yartsevo and Roslavl will be operating by the end of the 12th Five-Year Plan. [By Ye. Muravyev] [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 26 Mar p 2] 8936

MAZ-6422 TRUCK TRAIN PRODUCTION--Minsk--A series batch of a new generation of truck trains--the MAZ-6422--has come off the main assembly line of the Minsk Motor Vehicle Works. Professor M. Vysotskiy, doctor of technical sciences and chief designer of the Belavtomaz Association, comments on the event. The truck train is capable of carrying over 30 tons of freight and delivering it at the speed of a passenger car without refueling for 1,000 kilometers. Other truck trains--with relative materials consumption reduced by 10-20 percent as much--will come after the MAZ-6422. We believe that their service life will be brought up to 600,000 kilometers without concurrent major overhaul. This is extraordinarily important: after all, such vehicle repair costs more than the manufacture of a new one. The first models of such truck trains are nearing completion already. They are the MAZ-64221 and the MAZ-54321. The MAZ vehicles of tomorrow will have powerplants especially designed for truck trains. [By IZVESTIYA correspondent M. Shimanskiy] [Text] [Moscow IZVESTIYA in Russian 1 Apr 86 p 1] 8936

ROADS BUILT NEAR LUTSK--Lutsk--A paved road leads to the village of Zapripyat, in a wooded area of Volyn Oblast. Henceforth, practically all settlements in this very remote part of the oblast will be linked with rayon centers by motor vehicle access routes. Previously they could be reached during the season of impassable roads only by helicopter or all-terrain vehicle. Development of a transport network in the "deep" forest has been called for by a comprehensive program for road construction in the oblast for the 12th Five-Year Plan. Kolkhozes and sovkhoses have combined efforts with construction organizations for its implementation. [By SELSKAYA ZHIZN and TASS correspondents] [Text] [Moscow SELSKAYA ZHIZN in Russian 8 Apr 86 p 1] 8936

'DELTA' MOPED PRODUCTION--Riga--Along with the traditional mopeds, the "Sarkana Zvaygzne" Motorcycle Works [motozavod] is turning out original vehicles of the "mini-mokik" type. The second part of this name means that such a vehicle is started with a kick starter like a motorcycle. It is called "mini" because it is 1.5 meters long and just 64 centimeters high (if the handlebars are straightened out); it weighs a little over 50 kilograms. The Riga "baby" has been evaluated highly domestically and abroad. And today the plant has developed and put into production the next model of especially small means of transportation--the "Delta." It differs from its predecessors by its rakish shape and improved operating qualities. The location of the controls, the padded longer seat, the adjustable angle of the handlebars, the toolbox--everything was made after taking the demands of buyers in different age groups into account. Many parts were made of plastic, which made it possible to reduce the vehicle's weight. The fuel tank holds 1.5 liters more than the moped. With a full tank, the vehicle can run for 350 kilometers. The first

batch of the products has already been put on the market. Next year tens of thousands of "Deltas" will be coming off the assembly line. [By our correspondent V. Proskura] [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 8 Apr 86 p 2] 8936

MORE POWERFUL BELAZ ENGINE--Kolomna (TASS)--Engines of 2,300 horsepower will give the famous BelAZes [vehicles made by the Belorussian Motor Vehicle Works] a great deal of power. The collective of the "Kolomna Plant" association began series production of them yesterday. The Kolomna diesel is the first domestic engine of such power. Installed in a BelAZ with a load capacity of 180 tons, it underwent comprehensive testing in the region of Neryungri in the Yakut ASSR. [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 11 Apr 86 p 1] 8936

RSFSR ROADBUILDING QUALITY FAULTED--Results of the financial and economic activity of the republic's Ministry of Highways in 1985 were reviewed at a scheduled meeting of the Presidium of the RSFSR Council of Ministers. It was noted that roadbuilders had achieved fulfillment of the planned targets for road construction and capital repair. More than 10,000 kilometers of motor roads were put into use. The plan for payments to the budget was exceeded. At the same time, enterprises of the Ministry of Highways still have extensive resources at their disposal for a significant increase in the rate of roadbuilding and improvement in its quality, and for increasing the economic efficiency of production and operational activity. Having critically analyzed the work of the Ministry of Highways, the Presidium of the RSFSR Council of Ministers demanded that the ministry collegium and the sector's economic managers resolutely accelerate implementation of an entire range of measures to develop the road network of the RSFSR and bring it into the proper condition. The Ministry of Highways, in conjunction with the RSFSR Gosplan and local soviets, was ordered to urgently seek opportunities and resources for building and commissioning motor roads above the targets set previously. Particular attention was directed at improving the quality of road surfaces. [Text] [Moscow SOVETSKAYA ROSSIYA in Russian 14 May 86 p 1] 8936

CSO: 1829/163

RAIL SYSTEMS

BRIEFS

RADIO-CONTROLLED LOCOMOTIVES--Tests of a system to control locomotives by radio were begun on the Kuybyshev and South Urals railroads when the congress was in session. An electric locomotive placed at the end of the long train was put into operation by the usual radio channel. Commands were transmitted to it from the first engine by a special SMET [expansion unknown]-radio system. The innovation was developed by staff members of the VNIIZhT [All-Union Order of the Labor Red Banner Scientific Research Institute of Rail Transport] and specialists of the Locomotives Main Administration of the Ministry of Railways. It has a number of advantages over the SMET system now in operation. In particular, since remote control of electric locomotives has now become possible, time is not being spent to combine them into units. As A. Osyayev, head of the VNIIZhT laboratory, stated, the system is in steady operation. It is planned to continue tests of the innovation on sections of the South Urals Railroad. [By GUDOK correspondent B. Musalitin] When this issue was being made up, a report was received that a 6,000-ton unit [shestitsyachnik], driven with the aid of SMET-radio electronic equipment, traveled safely from Ufa through the Urals to Chelyabinsk. It is en route to Petropavlovsk. [Text] [Moscow GUDOK in Russian 28 Feb 86 p 1] 8936

COMPUTER-AIDED CONTAINER TRACKING--Tula--Specialists of the Tula Planning and Design Bureau of Automated Control Systems of the Ministry of Instrument Making, Automation Equipment, and Control Systems have introduced an automated system for tracking container shipments at a number of railroad stations. Now an operator can locate any container at a station within seconds with the aid of a video terminal. The planned daily production quota is established, consists are organized, and many other operations are being performed with the aid of the computer. The economic gain from introducing the ASU [automated control system] at five railroad stations will total 2 million rubles this year alone. [By A. Bakhtina] [Text] [Moscow SOVETSKAYA ROSSIYA in Russian 9 Mar 86 p 1] 8936

FAR EAST TRANSIT CARGO DISCUSSED--Irkutsk--An international conference to coordinate the scope of export, import and transit freight shipments among the USSR, the Mongolian People's Republic, the PRC and the DPRK was held in Irkutsk over a 10-day period. Its participants--representatives of the railway, transport and foreign trade ministries of these countries, as well as the Railroad Cooperation Organization (OSZhD)--analyzed work in 1985, generalized and adopted for application the valuable experience accumulated

over this time, examined the causes of shortcomings in organizing shipments, and decided on appropriate measures to eliminate them and to improve cooperation further this year. The meeting was held in a businesslike atmosphere, with complete mutual understanding and the desire by all sides to contribute in a tangible way to ensure extremely smooth operation of the transport production line. Important documents were signed and organizational and technical measures for coordinating transport were examined. [From our own sources] [Text] [Moscow GUDOK in Russian 12 Mar 86 p 3] 8936

KELES--DZHILGA LINE ELECTRIFICATION--Keles, Tashkent Oblast (UZTAG)--The next electrified section of the Central Asian Railroad--between the Keles and Dzhilga stations--is ready to receive voltage. Preparation is being completed on the Darbaza-Dzhilga section and adjustment of transformer substations is under way. The entire line from Chengeldy to Shumilovo, which runs from Tashkent to the north, up to the interchange with the Alma-Ata Railroad, should be taking electric freight trains in the first year of the five-year plan. [Text] [Tashkent PRAVDA VOSTOKA in Russian 14 Mar 86 p 1] 8936

WORLD'S LARGEST FLATCAR TRANSPORTER--Voroshilovgrad--The Stakhanov Railroad Car Plant has received the design documentation for manufacture of the world's largest articulated railroad transporter, capable of carrying large-sized loads of up to 700 tons. It is well known that enterprises and production associations are utilizing highly efficient units of large single-unit capacity more and more frequently in the century of scientific and technical progress. This involves various types of reactors, transformers, turbogenerators... Water, highway and rail routes have been used to deliver these gigantic items. Today superpowerful units, especially in nuclear power engineering, tend to be even heavier, and hence they promise to become a difficult burden for transport workers. The Voroshilovgrad designers, calling upon railroad scientists, materials technologists and other specialists, have drawn up documentation for the manufacture of a unique transporter which will be able to carry items weighing up to 700 tons and up to 17 meters in length. [By IZVESTIYA correspondent] [Text] [Moscow IZVESTIYA in Russian 15 Mar 86 p 1] 8936

NEW LENINGRAD TERMINAL PLANNED--Dozens of long-range passenger trains and suburban trains which operate to the northeast will be arriving not at the Moskovskiy railroad terminal, but at a new one--the Ladozhskiy terminal. According to LENTASS, the collective of the Lengiprotrans [Leningrad State Planning and Surveying Institute] has begun designing it. The new terminal, the sixth in succession in our city, will not be far from the existing Dacha Dolgorukova freight station. Erection of the "northern gates" of Leningrad will make it possible to not only relieve the Moskovskiy terminal of the vast number of long-range and suburban trains which arrive here daily, but it will also provide the opportunity to switch over the traffic of electric railroads which now comes to the Finlyandskiy terminal from Melnichnoye Ruchye and Sosnovo. The designers are providing for an interchange between the new railroad terminal and the surface entrance of the "Ladozhskaya" metro station, which went into operation recently. At the same time, it was decided to modernize the track of the 30-kilometer Zanevskiy Post-Gory line. [Text] [Leningrad LENINGRADSKAYA PRAVDA in Russian 19 Mar 86 p 4] 8936

I-SERIES METRO CAR TESTING--S. Terentyev from Saratov said that he has seen light gray cars in the Moscow Metro that are spacious and of unusual shape. V. Smirnov, deputy chief designer of the Mytishchinskiy Machine Building Plant, responds. The visitor from Saratov saw the new I-series cars, which are being tested on the circumferential line of the capital's metro. The first experimental batch of four such cars has arrived at the "Krasnopresnenskoye" depot. Their bodies are made of aluminum alloys rather than steel, and they have become much lighter. The hexagonal shape of the unit provides the opportunity to increase the floor area in the cars--the passengers' seats have been moved toward the sides of the deepened interior. The aisles have been made wider, and up to 30 additional persons are accommodated in them now. Special braking control has been applied in the new cars for the first time. When the speed is reduced, regeneration takes place, that is, electricity returns to the network, which provides considerable savings. As test runs have shown, a trip in such a consist is less tiring: a system of pneumatic springs ensures that the position of the body is stable and movement is made smoother. For this reason, jolts from the side are practically imperceptible. Additional conveniences also have been provided for the drivers. The cabin is more spacious, the field of view has been improved, and noise-suppressing coverings have been utilized. And automatic ventilation and air conditioning ensure a favorable microclimate. Series production of the new cars is planned for 1988. [Text] [Moscow TRUD in Russian 22 Mar 86 p 4] 8936

AzSSR's ASKERAN STATION OPEN--The Azerbaijan Railroad's Askeran station is being opened for receiving and dispatching freight in carload and small-sized consignments, with loading of entire cars only on sidings and at locations not generally utilized, that is, in accordance with Section 3 of Tariff Manual 4. The Askeran station is being assigned the new code 58680. [Text] [Moscow GUDOK in Russian 19 Mar 86 p 2] 8936

VEKOVKA STATION UPGRADED--The Gorkiy Railroad's Vekovka passenger stop has been changed to the station category and is being opened for receiving and dispatching freight in carload and small-sized consignments, with loading of entire cars only on sidings and at locations not generally utilized, that is, in accordance with Section 3 of Tariff Manual 4. The Vekovka station has been assigned the new code 26140. The Vekovka station is 10 kilometers from the Nechayevskaya transit point and 81 kilometers from the Murom-1 transit point. [Text] [Moscow GUDOK in Russian 19 Mar 86 p 2] 8936

AZOVSTAL SPUR LINES ELECTRIFIED--Zhdanov (TASS)--Metallurgists of the Azovstal combine in Zhdanov are increasing the efficiency of intraplant transport. Electric locomotives have begun operating on the enterprise's spur lines. In the course of technical re-equipment, the capacities of the "Magnitka of the South" have been doubled over the past decade. The sizes of shipments also have increased, and diesel engines are unable to cope with them. The shift to electric traction will enable the metallurgists to speed up transport operations and save 15,000 tons of diesel fuel annually. Expansion of plant electric lines has been called for by the comprehensive "Transport" program developed in the republic. Metallurgists in Dnepropetrovsk, Krivoy Rog, Zaporozhye and other cities are shifting their transport operations to the advanced form of traction. [Text] [Moscow GUDOK in Russian 20 Mar 86 p 2] 8936

VOLGOGRAD LRT SYSTEM EXPANSION--Volgograd, 30 [Mar]--Light rail transit, much of the route of which is underground, has become familiar to residents of Volgograd. Now the second section is under construction, and the line in operation is continuously being improved. The original technological innovation was tried out here and has demonstrated its efficiency. Panels have been installed in nearly 30 cars which provide the driver, with the aid of monitors, with the needed information: if the section ahead is free, and what the light signal indicates. This provides the opportunity to maintain optimum traffic speed. The basis of the innovation is the system used by railroad workers. The design was developed by specialists of the Moscow Institute of Railroad Transport Engineers, the equipment is being manufactured at Volgograd enterprises, and the assembly and adjustment is being performed by the street car and trolleybus administration and a specialized organization. Automation will make it possible to increase the speed of the cars, and their traffic spacing will be reduced from 3 to 1 or 1.5 minutes. [By PRAVDA stringer V. Kornev] [Text] [Moscow PRAVDA in Russian 31 Mar 86 p 1] 8936

NEW ALMA-ATA RAILROAD STATION--A new station, situated in the Berlik-1 to Aktogay section of the Alma-Ata Railroad, has been assigned the name Iliyskaya (code 75080). The Iliyskaya station is 500 kilometers from the transit point of Aktogay and 360 kilometers from the transit point of Berlik-1. [Text] [Moscow GUDOK in Russian 26 Mar 86 p 2] 8936

PURPE--SYVDARMA SECTION OPERATIONAL--The 111-kilometer Purpe-Syvdarma line on the Sverdlovsk Railroad has been accepted for continuous operation. The following junctions have been opened on it: the Khasyrey siding (code 83761), Purovsk (83770), the Limbey siding (83771), and Syvdarma (code 83780). [Text] [Moscow GUDOK in Russian 26 Mar 86 p 2] 8936

BAM'S KHOROGOCHI--YUKTALI LINE OPERATIONAL--The 256-kilometer Khorogochi-Yuktali line on the Baykal-Amur Mainline has been accepted for continuous operation. The following junctions have been opened on it: the Lumbir siding (code 99551), Larba (99540), the Elgakan siding (99541), Lopcha (99530), Chilchi (99520), Dyugabul (99521), and Yuktali (code 99500). [Text] [Moscow GUDOK in Russian 26 Mar 86 p 2] 8936

NEW BAM JUNCTIONS--The following junctions have been accepted for continuous operation on the 81-kilometer Kunerma-Severobaykalsk line of the Baykal-Amur Mainline: the Delbichinda siding (code 99291), Daban (99300), the Goudzhekit siding (99301), the Tyya siding (99302), and Severobaykalsk (code 99320). [Text] [Moscow GUDOK in Russian 26 Mar 86 p 2] 8936

URGAL-2 BECOMES NOVYY URGAL--The Urgal-2 station, renamed the Novyy Urgal station (code 99820), has been put into continuous operation on the 282-kilometer Novyy Urgal-Fevralsk line of the Baykal-Amur Mainline. The length of the Novyy Urgal to Urgal-1 section has been changed to 15 kilometers instead of 11. [Text] [Moscow GUDOK in Russian 26 Mar 86 p 2] 8936

NEW WEST KAZAKHSTAN FREIGHT YARD--The Uralsk-tovarnyy station of the West Kazakhstan Railroad has been opened for receiving and dispatching freight in carload and small-sized consignments, with loading of entire cars only on sidings and at locations not generally utilized, that is, in accordance with Section 3 of Tariff Manual 4. The Uralsk-tovarnyy station has been assigned the new code 71150. [Text] [Moscow GUDOK in Russian 26 Mar 86 p 2] 8936

KHARKOV METRO EXPANSIONS PLANNED--Kharkov--Kharkov metro builders have decided to turn over three underground stations for operation and to complete construction of the metro's second section ahead of schedule, by the anniversary of the October Revolution. These days the construction workers have begun driving the third and final line at the same time. This metro, the country's sixth, is just 10 years old. From their very first steps, the builders of the mainline were able to make their own contribution to domestic metro construction. Designers and builders have achieved the maximum industrialization of all production and finishing processes and installation of equipment. The double-level "Dzerzhinskoy" unit has become the model for making underground chambers [dvortsy] which are not built in deeply in a city with dense development. And the metro bridge across the Kharkov River with an enclosed heated tunnel not only is convenient for the movement of trains, it has significantly reduced operating expenses... According to V. Spivachuk, chief architect of Kharkovmetroproyekt, "the most advanced experience in building station complexes was taken into account in designing the metro's third line. The new route is closely linked with the city's future development. As before, our metro will not have surface structures." [By IZVESTIYA correspondent A. Kleva] [Text] [Moscow IZVESTIYA in Russian 28 Mar 86 p 1] 8936

TEM2 DIESEL LOCOMOTIVE MODIFICATION--Bryansk--Bryansk diesel locomotive builders have completed assembly and delivery testing of an experimental batch of locomotives equipped with a system for distributing current among groups of traction engines. This system increases tractive force in the limited area for coupling by an average 8-10 percent. On the outside, these diesel locomotives are nearly identical to the series TEM2. Only the experienced eye will detect a silver casing for additional equipment on the cowling. The so-called correcting resistor was developed by the brigade consisting of I. Timofeyev, a Ministry of Railways specialist; V. Grinevich and O. Myagkikh, staff members of the All-Union Scientific Research Diesel Locomotive Institute; and D. Solovov of the Bryansk Machine Building Plant Production Association. The effectiveness of the innovation, which makes it possible to increase the locomotive's tractive force without increasing its coupling weight and power, was demonstrated in tests of TEM2 No 7609 on the experimental circuit of the VNIIZhT [All-Union Order of the Labor Red Banner Scientific Research Institute of Rail Transport] and on tracks of the Bryansk-2 station. The first diesel locomotives with the current distribution system have been sent to the Far Eastern and Alma-Ata railroads, where they will be operated under different climate conditions. [By engineer V. Krukovskiy] [Text] [Moscow GUDOK in Russian 5 Apr 86 p 2] 8936

YAKHINO STATION, YARD EXPANSION--Chelyabinsk--The Yakhino station, on the border between Chelyabinsk Oblast and the Bashkir ASSR, changes its appearance with each day. It is well known that the South Urals Mainline is the "window to Asia." In order to speed up the movement of freight, they decided to take trains weighing 6,000 tons across the Urals after experimental tests. But here's the problem: the station's existing tracks, situated in the neck [gorlovina] of the mountains, are not able to accommodate such long consists. For this reason, they decided to rebuild the Yakhino station as well. Located several kilometers from the junction station of Kropachevo, it should become the original yard for it. Sixteen receiving and dispatching lines under construction here, each one 1.5 kilometers in length, make it possible to receive 6,000-ton trains from the Kuybyshev Railroad and to transfer them to it. "A great deal of work is under way," said I. Vorobyev, chief of the South Urals Railroad. "I will cite just one example. Where there is now a construction site, there was a marsh at the foot of the mountain. We had to excavate, break up and take out 130,000 cubic meters of soil and fill up the marsh with it." [By IZVESTIYA correspondent G. Shcherbina] [Text] [Moscow IZVESTIYA in Russian 5 Apr 86 p 2] 8936

SARATOV AREA ELECTRIFICATION WORK--Saratov--The collective of SMP-823 [construction and installation train 823] of the Odesstransstroy Trust has begun electrification of the Atarsk-Blagodatka line. After the preparatory "windows," the work trains erected the first 10 supports for the catenary system on the Saltykovka-Blagodatka line. Because of the deep snow cover, the ground here froze to a depth of no more than 30 centimeters during the winter and gave way easily to the foundation digger. This year, the SMP-823 and other subunits of the Odesstransstroy Trust have to utilize 2.4 million rubles for electrification, and by the end of the first 6 months of 1987, the trains will be drawn by electric locomotives in this section. The Saratovtransstroy Trust has been charged with carrying out similar operations now in the neighboring Krasavka-Saratov section. Unfortunately, they are not in very much hurry there and haven't begun work yet. But after all, the first quarter is already in the past, and valuable time should not be missed. [By S. Kasatyy] [Text] [Moscow GUDOK in Russian 12 Apr 86 p 2] 8936

PAKHTA STATION OPEN--The Pakhta station of the Central Asian Railroad is being opened for receiving and dispatching freight in carload and small-sized consignments, with loading of entire cars only on sidings and at locations not generally utilized, that is, in accordance with Section 3 of Tariff Manual 4. The Pakhta station is being assigned the new code 77980. [Text] [Moscow GUDOK in Russian 16 Apr 86 p 2] 8936

YEVLA KH--BELOKANY LINE OPERATIONAL--The 163-kilometer Yevlakh-Belokany line of the Azerbaijan Railroad has been accepted for continuous operation. The following junctions have been opened on it: the Khanabad siding (code 58952), the Sabukhi siding (58951), Sheki (58950), Kakhi (58960), Zakataly (58970), and Belokany (code 58980). [Text] [Moscow GUDOK in Russian 16 Apr 86 p 2] 8936

KRIVOIY ROG LRT SYSTEM CONSTRUCTION--Krivoy Rog--Work on the light rail transit line linking the Mudrenaya station district with the remote housing developments of the city of Krivoy Rog is in full swing. It is not without reason that city residents are calling the future transport artery "our metro." More than 2 kilometers of the route runs underground, after all. The brigade of V. Travkin from tunneling detachment No 26 of the Minskmetrostroy is now laying the tracks. Nearby, tunnelers led by I. Zezyuley are working on the 3-kilometer section of the second stage. Modern cars made in the CSSR will be running on the startup section of the LRT line, which will have four stations. [By A. Prokhoda] [Text] [Moscow GUDOK in Russian 26 Apr 86 p 3] 8936

MOSCOW--URALS ROUTE ELECTRIFICATION--Cheboksary, 27 [Apr]--Electrification has been begun on the final section of one of the country's oldest railroad mainlines, linking Moscow with the Volga and the Urals. It passes through the Chuvash ASSR, the Tatar ASSR, and Gorkiy Oblast. The latest automatic equipment, which will make it possible to utilize electric power more economically and ensure the best operating conditions for the machinery, will be employed in the section. Technical renovation of the Kanash station, the large rail junction called the gates of Chuvashiya, is under way. [By PRAVDA stringer Yu. Knyazev] [Text] [Moscow PRAVDA in Russian 28 Apr 86 p 1] 8936

TRUSOVO--AKSARAYSKAYA LINE ELECTRIFICATION--Astrakhan--The first 100 supports for the catenary system have been erected by the SMP-179 brigade of the Sevkavtransstroy Trust on the Delta-Rychinskiy line. So electrification of the Trusovo-Aksarayanskaya section has been begun. In the near future, electric railroads will become a convenient means of transport for the builders and workers of the well-known Astrakhan Gas-Condensate Complex under construction here. Another subunit of the trust--SMP-205, which also will take part in electrification of lines in the Volga delta, is now building a facility for electrical centralization of switches [post ETs] at the Aksarayanskaya station and lengthening its incoming and outgoing tracks. And a subcontracting organization has begun construction of a footbridge. Suburban electric trains will begin operating on the section in the first days of 1988. [By S. Kasatyy] [Text] [Moscow GUDOK in Russian 30 Apr 86 p 2] 8936

OCTOBER RAILROAD ELECTRIFICATION WORK--Leningrad, 6 May--A new electrified section put into operation on the October Railroad will help to improve the efficiency of the transport system to the country's northwest. It has linked routes of the Karelian isthmus with the Pskov route and with the Baltic republics. Today the first heavy train--the next one from the Ladoga region quarries with a load of building materials--passed over the renovated line. "With the completion of operations, a unique power circuit within the Leningrad rail hub has been connected," G. Fadeyev, chief of the mainline, said. "Until recently, this stretch held back the transport flow; we had to replace the electric locomotives with diesel ones." The railroad workers are energetically renovating the track, building new bridges, and installing the catenary wiring. [By TASS correspondent] [Text] [Moscow GUDOK in Russian 7 May 86 p 1] 8936

STATION NAMES CHANGED--The Tyulgan station on the Kuybyshev Railroad has been renamed the Vladimirskaia station (code 70740). A new station in the Dema-Tyulgan section has been assigned the name Tyulgan. It was opened for operation in accordance with Section 3 of Tariff Manual 4. It has been assigned the code 70770. It is 325 kilometers from the Tyulgan station to the Dema transit point and 728 kilometers to the Kartaly-1 transit point. [Text] [Moscow GUDOK in Russian 9 May 86 p 2] 8936

BERDICHEV-ZHITOMIRSKIY STATION CLOSES--The Berdichev-Zhitomirskiy station on the Southwestern Railroad is being closed for receiving and dispatching freight in carload and small-sized consignments, with loading of entire cars only on sidings and at locations not generally utilized, that is, in accordance with Section 3 of Tariff Manual 4. [Text] [Moscow GUDOK in Russian 9 May 86 p 2] 8936

CSO: 1829/164

MARITIME AND RIVER FLEETS

CHIEF ON NORTHWESTERN RIVER SHIPPING COMPANY OPERATIONS

Moscow RECHNOY TRANSPORT in Russian No. 1, Jan 86 pp 3-5

[Article by V. Fomin, General Manager of the Northwestern River Shipping Company: "The Components of Success"]

[Excerpts] While preparing for the 27th Congress of the CPSU the personnel of the Northwestern Shipping Company are making inventory of the work performed in 1985 and during the whole five-year plan period.

The shipping company has achieved certain accomplishments in economic and social development, and has exceeded the five-year targets in shipments and traffic, measured as a sum of the annual results, by 2.3 million tons and 1.5 billion ton-kms.

During the 11th Five-Year Plan period the assets have grown by 20 percent in fleet, by 150 percent in cargo handling equipment, and by 50 percent in industry.

The fleet has been developed significantly. Its composition has changed considerably, and high tonnage combined river-sea vessels comprise the core of the fleet. The total tonnage of self-propelled cargo carriers grew by more than 30 percent in five years. Machinery availability in ports has increased. The Cherepovets and Leningrad ports have been further developed.

The 312 meters long mechanized cargo berth with four 10-16 tons capacity gantry cranes was put into operation in the Cherepovets port. The 150 meters long cargo terminal with crane rail tracks and cargo storage areas of 6,000 sq. meters was put into service in the Leningrad port. Special attention is given to environmental protection. Just recently a special pier on the Neva river for waste delivery was commissioned; its total length is 120 meters, its capacity is 1,000 cubic meters per day, at a cost of 580,000 rubles.

Non-common use berths were developed. The shipping company serves 118 such berths with the total length 18,900 meters in four oblasts: Leningrad, Vologda, Novgorod, and Pskov.

In order to further improve utilization of the fleet at those berths the services of the shipping company have developed an integral program for reduction of the vessels' cargo handling time, and also measures which provide for their reconstruction and for construction of new berths.

Developing and improving the operational experience of the Leningrad transport personnel, which was approved by the CPSU Central Committee, represents the main direction in the activities of the shipping company. The working cooperation of merchant marine, railroad, and river transport personnel provided for increase of delivery of coal for the Leningrad power stations by river transport, shipment of import cargoes from the Leningrad sea port, and also for shortening the idle time of transport means.

A new system has now been developed and put into operation, which allows planning and coordinating the activity not only of the transport companies but also of the shippers and receivers of cargo as participants in the transport process. It is called the system of continuous planning of cargo delivery.

Due to the introduction of new forms of working cooperation, modern labor and production methods, and to the development and productivity improvement of the technical base, the shipping company has improved the transport service, increased the quality of operations, and reduced total cost of cargo delivery.

Total shipment has reached 48 million tons. During the last four years the labor productivity at cargo handling operations increased by 9.3 percent, direct cargo transshipment grew by 32 percent, and the average cargo handling time per vessel fell by 9.1 percent. As a result 3.8 million ton-days were saved, which allowed for an additional shipment of 760,000 tons and traffic of 390 million ton-km. The shipment of import cargo from the Leningrad sea port by river increased more than two-fold against 1980.

As a result of working cooperation a specialized motor ship for transporting grain from the Leningrad sea port to the S.M. Kirov Grain Milling Complex has been developed. As per suggestion of the experts of the shipping company, the Central Technical and Design Bureau [TsTKB] has developed a design of an R-32-3 motor ship class capable of operating in ice-covered rivers and passing under the Leningrad draw-bridges without their raising; based on this design the Nevskiy Shipbuilding and Ship Repair Yard [SSRZ] has built the NEVSKIY-22 vessel intended to carry grain. Meanwhile, the grain milling complex has modernized its cargo handling equipment so that it can operate at sub-freezing temperatures. All this has permitted extending the navigational period and increasing the volume of shipments.

Thanks to this vessel for the first time in the history of navigation of the Neva river the 1984 shipping season started in March. As a result, 37,000 tons of grain were shipped, which freed 620 railroad cars. During the winter this motor ship was successfully used for grain transporting from the lightering anchorages to the sea port.

Construction of other vessels of this class is underway. It will make it possible to transport up to 300,000 tons of grain annually and replace 7,000 railroad cars. These vessels were also used for carrying mineral construction materials without raising the Volodarskiy draw-bridge. As a result the fleet turnover has been reduced by more than one day and 300,000 ton-days have been saved. In cooperation with autotransport the delivery of cargoes to the Leningrad construction sites from berths at quarries which belong to the Main Leningrad Administration of Construction Materials has been speeded up.

In order to provide for more efficient transportation service in the Leningrad region the Ministry of the River Fleet has decided to build a series of such vessels, and also a series of port ice-breakers with shallow draft for operation during the extended shipping season.

There has been developed and put into service a cargo handling system in the Leningrad port which brought together various units of cargo handling equipment and resulted in reduction of loading time of a motor ships of the Volgo-Balt class from 18 to 3 hours; it could then pass under the Volodarskiy bridge in the period between the first and second raising of the bridge, which decreased the vessel idling time by one day.

Reduction of time required for the integral fleet servicing [KOF] creates large reserves of improvement in fleet utilization. In order to improve the fleet servicing in the shipping company a new structure of management and organization has been developed, cost-accounting interrelations have been reviewed, and the material and technical base has been developed. In order to make the service more effective and increase its active influence on the transportation process all elements of KOF management have been improved, including evaluation indicators, financial incentives and leverages, and the responsibility and incentive system.

During the 1985 navigation 10,000 self-propelled cargo vessels were serviced, 88,000 requests for service from the crewmembers of the merchant ships were satisfied, and 14 percent more vessels were serviced than in 1980. The average time for servicing the self-propelled fleet was reduced by 39.4 percent, 3.5 million ton-days were saved, and 50.2 percent of the vessels in transit through the Cherepovets port were serviced without stopping. Due to the use of the permanent berth in the Leningrad port the time required for registration of the entry and departure of river vessels for and from foreign ports was reduced by 30 percent. The reorganization of KOF management has provided for a total economic savings of about 2 million rubles during the five-year plan period.

There are other equally significant factors such as improvement of working and living conditions of vessel crew-members, reduction of mental stresses and physical fatigue, and improvement and moral and psychological climate in the crews.

Although a lot has been done to improve the servicing of the fleet, unresolved problems still remain. The disproportion is still widening between the rates replenishment of the transport fleet and the growth of service means (special vessels, autotransport, shore bases). The shipping company has received only eight units of servicing technical means during the five-year period which comes to only 14 percent of the total number of units included in the company's requests. The lack of technical means affects the servicing of the expensive transport fleet. For example, absence of a self-propelled tanker for vessel bunkering in Cherepovets port has resulted in nonproductive idling of the cargo fleet (up to one million ton-days).

Reduction of repair time is a significant means to improve the carrying capacity of the fleet. Time spent on repairs of the company's cargo carriers makes up 2 percent of the total operational time.

An important measure is the extension of the interval between medium overhauls. This method is utilized by over 200 crews. The system of vessel delivery into operational readiness under winter conditions has been developed and put into service.

Some difficulties also remain with vessel dry-docking, especially in spring. More than 350 vessels per year are in need of such operation.

This problem is partially solved by intensification of dry-dock and slipway operations in winter. Organizational and technical measures aimed at increasing the capacity of the shiplifting installations during the time between navigational seasons have been worked out at enterprises. Their implementation has made it possible to repair up to 160 vessels under icy conditions.

The brigade contract method is being introduced into winter ship repairs in accordance with the plan. Contracts on repair work are signed with the labor teams; these contracts are reinforced by an efficient system of material incentives for keeping within deadlines, for saving materials, and for the quality of work.

The extension of the navigational period on the inland waterways represents the most important way to further increase cargo shipments. Together with the Leningrad Water Transportation Institute [LIVT] the shipping company has developed and is currently implementing a special program aimed at this. During the extended navigational period over 1.5 million tons of cargo is transported. However, a really successful development of transportation during this period is hindered by the lack of ice-breakers. We are unable to extend the navigational period in accordance with the scientific recommendations and accumulated experience.

The river-sea combined-operation vessels occupy a significant place in the company's fleet. They are efficiently used year around by organizing their winter operation in non-freezing sea areas.

Much attention is given to the technical preparation of the fleet, its staffing with personnel, and its cargo and commercial supplying.

Over 70 vessels are in operation in winter time. Over one million tons of various cargoes per year are carried. Due to the winter operation of the fleet, labor productivity, exploitation of fixed assets, and profitability are growing.

But there are problems here, too. It is necessary to work out a more accurate system of planning for winter time transportation, which would allow for a more rational distribution of shipments between the Ministry of the Maritime Fleet [MMF] and the Ministry of the River Fleet. It is necessary to speed up the construction of a non-freezing repair base in Kaliningrad.

Major research aimed at expanding the operational areas for combined river-sea operation vessels is being carried out. The total savings per navigational period has reached six million rubles. As a result of the increased utilization of these vessels about one million rubles per year are saved.

The Nevskiy-class cargo carriers, BT-801 class tug-boats, and Fontanka-class pleasure cruise boats which were designed by the TsTKB and built by the shipping company's shipyards have shown good results.

In accordance with the decisions of the April (1985) CPSU Central Committee Plenum the shipping company has developed a specialized program entitled "Intensification-90". It is intended to change the composition of the capital investments by increasing the share of the funds for reconstruction and technical retooling by 71 percent, to reduce the time required for starting up and putting into normal operation new facilities of industrial enterprises and ports.

It is planned to develop automatic production lines, to introduce computer aided design systems, numerical control machine tools, and modern production processes including flow-line production processes in ship repairs. The number of tasks which are processed with the aid of computers should almost double in the 12th Five-Year Plan period.

The Nevskiy Shipbuilding and Ship Repair Yard should play a special role. Here a technology progress center is being created which is aimed at developing new methods of ship construction and repair which will be used by other shipyards.

Much attention in the program is given to further reducing the time required for cargo handling and servicing the vessels. It is intended to

complete the construction and to put into service a new cargo transfer port on the Svir river, to introduce modern cargo handling equipment, including the unique, highly productive dredge pumps and hydraulic cargo handling machines, to increase the mechanization of the berths, and to introduce modern technology and high-speed vessel handling techniques. It is planned to improve inter-ministerial relations with other types of transport, and with shippers and clients by strengthening the coordination of long-term and current plans. Within the program's framework the volumes of delivery and transferring of cargoes have been coordinated between the Baltic Maritime Shipping Company and the October Railroad, and also with other institutions.

In accordance with the "Intensification-90" program it is planned to improve the navigational conditions in the basin by introducing radar and laser pilotage for sailing under Leningrad bridges and in dangerous waterways, and to overhaul and upgrade the berths, storages, and other structures of the Leningrad and Cherepovets cargo ports, Leningrad passenger port, and also of the Leningrad, Voznesensk and Podporozhye fleet repair and operation bases [REB].

It is planned to build passenger terminals in Leningrad (for sea lines), in Cherepovets, Pskov, Staraya Russa, mechanized cargo berths in Otradnoye and Primorsk, new repair and road steams in the Byelozersk port and Leningrad (up the river from the Volodarsky bridge), a special berth for integral fleet service in Leningrad, new production departments and other facilities at the Nevskiy, Cherepovets and Novo-Ladozhskiy shipyards.

It is intended to equip the new and upgraded facilities in ports and at manufacturing enterprises with modern equipment including machine tools (preferably numerically controlled ones), robots, and manipulators. In order to achieve maximum utilization of production capacities it is necessary to raise the level of automation and complex mechanization of production processes.

The construction cost of new vessels obtained by the shipping company has increased four and a half times during the last 15-20 years. The same holds true for cargo handling equipment.

Therefore, it is vitally necessary to design and build a modern fleet with an automation level which will allow us to reduce to a minimum the required servicing personnel.

It is worth creating a new type of oil/crushed stone carrier vessel for transporting petroleum materials from the Volga river points to the Pribaltic, and for carrying construction and grain cargoes from the renovated Novo-Tallinn transfer port on the return voyage. This will make it possible to increase the productivity of fleet operations by at least 3 percent.

There is more. The Baltiyskiy, Volgo-Balt and Sormovskiy classes of river-sea operation vessels have cargo capacity 2-3,000 tons; meanwhile,

the overall dimensions of the internal waterways permit the use of vessels with 5,000 tons and more capacity. It is a timely problem to build such vessels. It will permit an increase in labor productivity of almost two-fold and a significant reduction in the sea-going personnel.

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MARITIME AND RIVER FLEETS

BRIEFS

TANKER ALESHA DZHAPARIDZE TRIALS--Bucharest, 19 [Mar]--The oil tanker Alesha Dzhaparidze, built for the USSR at the Danube yard in Turnu-Severin, has left on its first test run in the Black Sea with an experienced Soviet crew. This shipbuilding enterprise at the Iron Gate is marking its 30th anniversary of collaboration with our country by turning out a series of tankers for the Caspian. The ships have been earmarked for the petroleum workers of Azerbaijan and will be named after the legendary 26 Baku commissars. The specialized seagoing diesel vessels sent from Turnu-Severin for Soviet customers have demonstrated high operational reliability. Construction of timber carriers which will be able to operate in the severe conditions of the Northern Sea Route will be begun at the Turnu-Severin yard in the near future. [By PRAVDA correspondent S. Petukhov] [Text] [Moscow PRAVDA in Russian 20 Mar 86 p 5] 8936

ZHDANOV SHIPYARD PROJECTS--Leningrad (TASS)--A ceremonial laying down of the large-capacity diesel vessel S. Kirov has taken place at the Leningrad Shipyard imeni A. A. Zhdanov. This ship, which is loaded horizontally, will head a series of transports which feature a high degree of operating economy. Highly productive machinery and advanced technology are being introduced and the brigade methods of organization and work incentives are being utilized to speed up construction of the dry-cargo vessels. [Text] [Moscow VODNIY TRANSPORT in Russian 3 Apr 86 p 1] 8936

NEW VESSELS FOR BALTIC SHIPPERS--The Baltic Shipping Company's fleet will be replenished by new specialized vessels this year. Five ships of the RO-30 type, the first of which was the diesel ship Skulptor Konenkov, already are operating on the Baltic Shipping Company's Baltic-Australia route and in the direction of Cuba. They are being built to order for the Soviet Union by Polish shipbuilders. These ships will carry up to 10,000 tons of different cargoes and reach a speed of up to 16.5 knots. The shipping company will receive one more of these vessels this year. Ships of the LO-RO type, which make it possible to conduct loading and unloading operations both "vertically" with the aid of portal cranes and "horizontally," when wheeled equipment and packaged cargo on roll-on trailers [roll-treylery] reach the holds "under their own power" by a ramp in the stern lowered onto the dock, have proved themselves well for ocean shipping. The shipping company will acquire the diesel ship Sverdlov in the second quarter this year, the ship Ulan-Bator in the third quarter, and another similar vessel in the fourth quarter. These

diesel vessels are expected to be used to ship cargoes between European ports and the United States. The fifth new ship this year will be a roll-on roll-off vessel, which will be delivered to Baltic shippers by the Shipyard imeni A. A. Zhda' v. [By V. Yeliseyev] [Text] [Leningrad LENINGRADSKAYA PRAVDA in Russian 6 Apr 86 p 2] 8936

RIGA - BILBAO LINE ESTABLISHED--An agreement on organization of a Soviet-Spanish scheduled navigation route has been signed in Madrid. The Latvian Shipping Company and the Spanish firm Vapores (Suar-Diaz) in Madrid are parties to the agreement. This route will provide for scheduled shipment of cargoes between the ports of Riga and Bilbao. [Text] [Moscow VODNYI TRANSPORT in Russian 15 Apr 86 p 1] 8936

NEW FREIGHTER FOR ESTONIANS--Tallinn--The new diesel ship Osvald Tuul has moored at a berth of the Tallinn maritime cargo port. "The Estonian Shipping Company doesn't have a ship of this type yet," says Captain-Instructor Roland (Leyt), who took part in accepting the ship in the Netherlands. "It has been equipped with modern radio navigation instruments." More than 4,000 tons of cargo were delivered to Tallinn from the French port of Rouen on the first voyage. [By Kh. Tokhver] [Text] [Moscow VODNYI TRANSPORT in Russian 29 Apr 86 p 1] 8936

KRASNOGVARDEYETS CONTAINER SHIP OPERATIONAL--Vladivostok (TASS)--The Far Eastern Shipping Company has acquired a new diesel ship. Unlike previous vessels, the Krasnogvardeyets is a general-purpose container ship. It is capable of carrying large- and small-sized containers at the same time. The shipping company will receive three more container ships during the five-year plan. [Text] [Moscow VODNYI TRANSPORT in Russian 29 Apr 86 p 1] Shipbuilders of the Georgi Dimitrov Combine in Varna have turned over a container ship designed to carry 400 containers to representatives of the Soviet maritime fleet. Named Krasnogvardeyets, the ship has been assigned to the Soviet Far Eastern Shipping Company. The Varna shipbuilders will build one more such vessel to order for the Soviet Union by the end of this year. [Text] [Moscow VODNYI TRANSPORT in Russian 29 Apr 86 p 1] 8936

NEW RIVER FREIGHTER FOR SIBERIA--The next ship built for the Soviet Union was launched by shipbuilders at the yard in the Romanian city of Oltenita, on the Danube. It is a dry-cargo vessel of the Lena type, adapted for navigation on Siberian rivers. More than 30 such ships are now in use on the Lena, Ob and Irtysh rivers. The Oltenita yard is linked with the Soviet Union by strong relations of long standing. Its construction was begun in 1948 with the Soviet Union's assistance at the place where a shop for repairing fishing boats was situated. It has been guided by the fulfillment of Soviet orders. Over these years the shipbuilders have accumulated a great deal of experience and quickly familiarize themselves with world shipbuilding achievements. The Oltenita shipyard now is one of the leading enterprises in this sector in the country. Vessels with a load capacity of up to 5,000 tons are built here, including dry-cargo ships of the Volgo-Don type, many of which are in Soviet shipping companies. In all, more than half of the Danube shipbuilders' output and about one-third of all seagoing and river vessels built in Romania are being exported to the Soviet Union. [Text] [Moscow VODNYI TRANSPORT in Russian 6 May 86 p 1] 8936

AUSTRIAN SHIPBUILDING FOR USSR--A ceremony was held at the shipyard in Korneuburg (Lower Austria) to mark the laying down of the two first specialized vessels for combined river and sea navigation which are being built to order for the Soviet Union. In accordance with an agreement between the All-Union Foreign Trade Association Sudoimport and the associated shipyards of Linz and Korneuburg, 10 vessels in all of this type will be built in the next few years. Collaboration between the USSR and Austria in the shipbuilding field has been continuing for over 30 years. Dozens of vessels--river passenger liners, dry-cargo ships, powerful tugs, hydraulic dredges, and so forth--have been built to order for the Soviet Union during this period. [Text] [Moscow VODNYI TRANSPORT in Russian 20 May 86 p 1] 8936

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PORTS AND TRANSSHIPMENT CENTERS

BRIEFS

NEW KRASNOVODSK BERTH CONSTRUCTION--Krasnovodsk--Rows of reinforced concrete pilings are being extended farther and farther into the sea. Construction of a new maritime berth has been begun in Krasnovodsk at the order of the Turkmenrybprom Production Association. Construction of it was brought about by the rapidly increasing volume of transport being handled by the Krasnovodsk maritime cargo port. The port's old berths became inadequate with the introduction of new seagoing ferryboats and the continuously increasing volume of cargo traffic on the Caspian. Seiners would lie idle in the roadstead waiting for their turn to be unloaded. Now specialists and workers of the Azerbaijantransstroy Trust are building a new berth for fishing boats at a rapid pace. Ships will be moored from both sides, and two portal cranes will be positioned on the pier. [By A. Lenskiy] [Text] [Moscow IZVESTIYA in Russian 24 Feb 86 p 2] 8936

NEW BREZHNEV RIVER PORT--Brezhnev--The new Naberezhnyye Chelny river port is ready to accommodate ships, passengers and cargo. It is situated within the city limits in the vicinity of the Nizhnekamsk GES. Every convenience has been provided for the ships and the people here. The Nizhnekamskgesstroy construction workers have deepened the water area, erected berth partitions, facilities for overall maintenance of navigation aids [plavsredstva], repair shops, warehouses, and a container platform. Diesel vessels and barges will be able to enter the area where the port cranes are in use by a special channel. Comfortable waiting rooms, cashier accommodations, rest rooms, a dining room, and stores are being provided for travelers. Both the river workers and passengers will be able to evaluate all this at its true worth with the opening of navigation. [By Ye. Ukhov] [Text] [Moscow TRUD in Russian 27 Mar 86 p 4] 8936

ICE USED TO BUILD BERTH--Chukotsk Autonomous Okrug--A new heavy-duty berth is ready for ships in the forthcoming Arctic navigation period at the polar settlement of Mys Shmidta. Metal, concrete and wood were not needed to build it; they were replaced entirely by water and freezing weather. Sea water, released continuously on an ice floe 300 meters long and 50 meters wide, froze rapidly in the cold weather. So they raised the structure layer upon layer, until the mass of ice dropped to the bottom under its own weight. [By IZVESTIYA correspondent R. Bikmukhametov] [Text] [Moscow IZVESTIYA in Russian 26 Apr 86 p 2] 8936

NEW MODEL FLOATING CRANE--A new model floating crane with a hoisting capacity of 120 tons has been launched by shipbuilders of the Budapest ship and crane yard. It features an improved design and better maneuverability, and electronic equipment was extensively utilized for the crane's control system. Deliveries of the new model from the Hungarian enterprise to fraternal socialist countries will be organized soon. Shipbuilders of the Hungarian People's Republic are taking part more and more actively in carrying out the overall program of socialist economic integration. For many years, the Soviet Union has been the most important customer for their portal and floating cranes and powerful tugboats. These products now may be seen in nearly 100 river and maritime ports of the USSR. [Text] [Moscow VODNIY TRANSPORT in Russian 20 May 86 p 1] 8936

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